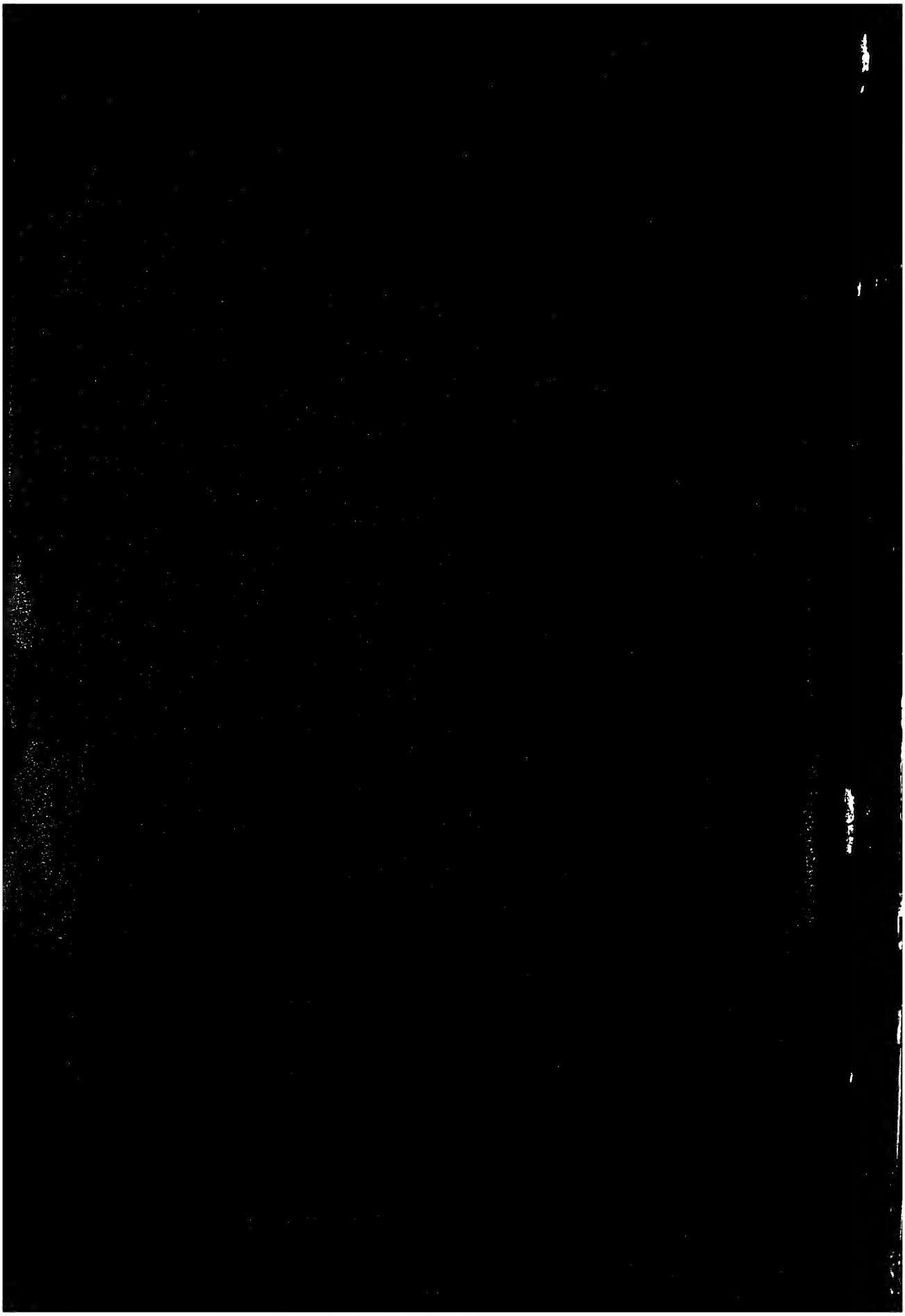

NORTH WEST OF CANADA.

REPORT

TO THE

BOARD OF TRADE

ON THE

NORTH WEST OF CANADA,

WITH SPECIAL REFERENCE TO

WHEAT PRODUCTION FOR EXPORT.

BY

JAMES MAVOR,

PROFESSOR OF POLITICAL ECONOMY IN THE UNIVERSITY OF TORONTO, CANADA.

1904.

Presented to both Houses of Parliament by Command of His Majesty.

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PREFATORY NOTE.

SIR,

of

m

In P
who assiste ion
of the obligati of the
Dominion, Provinc und to the
authorities of the Canad adian Northern
Railway, who rendered invaluable in the prosecution of the
inquiry.

I am, &c.
H. LLEWELLYN SMITH.

Commercial Department,
Board of Trade.
July 1905.

To the COMPTROLLER-GENERAL of the COMMERCIAL, LABOUR, and STATISTICAL DEPARTMENT of the BOARD OF TRADE.

SIR,

THE present Report on the North West of Can... reference to wheat production for export, offers in... results of inquiries extending over eight years, and... North West, in 1898, in 1899, and (at the instanc... in 1904. About seven months were spent in th... important districts into which settlement had... visited, and the country was traversed in... almost all the lines of railway, and for upwar...

The region to which the Report refers comp... tive divisions of the Province of Manitoba, ... Saskatchewan, and Alberta. The area as a ... Canadian North West. It is situated betwe... between long. W. 96° and long. W. 115°... 372,112 square miles, or 238,151,415 acres ... as shown in the following Table :—

District.	Land.	
	Acres.	
Province of Manitoba - - -	41,169,098	
Territories :—		
Alberta - - - -	64,073,212	
Assiniboia - - - -	56,498,546	
Saskatchewan - - -	66,460,859	
*Total of above-mentioned Territories -	187,932,617	
Total of Manitoba and the above-mentioned Territories - -	229,101,715	9,01...

The Report opens (pp. 1–11) with a brief outline of ... physical geography, and climatology of the region, which is a ... introduction to a study of its agricultural resources or a forecast of its fu... development. This is followed (pp. 12–34) by an account of the settlement of the North West, taking into consideration both the nationality and characteristics of the immigrants and the systems of settlement adopted. This again is a necessary preliminary to any sound treatment of the question of the agricultural future of the country.

The next section (pp. 34–79) deals with the history, present conditions, and prospects of agriculture in the region to which the Report refers, with special reference to wheat-growing. It includes, on pp. 68–77, a discussion

* Exclusive of the Territories of Athabasca, 251,965 square miles; Mackenzie, 562,182 square miles; and Keewatin, 470,416 square miles, which, with the Territories above-mentioned, comprise the North-West Territories. The total area of the North-West Territories is 1,582,943 square miles.

of certain estimates of the possible area of wheat-growing in the North West, and of the possible production and export of wheat in the future. This discussion is supplemented by the two following sections of the Report (pp. 80–91), which treat of the questions of population, and of prices in relation to productivity, while the 7th section (pp. 92–113) deals with the ...ry important factor of transportation by road, railway, and internal ...ys, and the methods of storage and marketing. A summary of ... conclusions completes the Report.

...us be allowed to take this opportunity of thanking ...er of persons who facilitated my inquiries, both during ...respondence during the past years; and especially of ...f the Dominion, Provincial, and Territorial Govern- ... the various Departments, particularly those of ... to whom I am indebted for many courtesies. ...nks to Sir William van Horne and to Sir ...Canadian Pacific Railway, to Mr. William ...orn Railway, and to many officers of these ...hich in every way they have assisted me

I am, &c.

JAMES MAVOR.

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METEOROLOGICAL SERVICE
DOMINION OF CANADA.
NORTH WEST TERRITORIES.

Upper Figures give Number of Years of Observation, Lower Figures give Mean Annual Precipitation in Inches.

BRITISH COLUMBIA

ALBERTA

SASKATCHEWAN

MANITOBA

ATHABASCA

KEEWATIN

FORT CHIPPEWYAN 11 12 84

FORT DUNVEGAN 2 27 21

EDMONTON 20 16 73

NE BEAVER HILLS 2 25 05

W BEAVER HILLS 6 23 76

PRINCE ALBERT 18 15 35

BATTLEFORD 12 14 11

HENRIETTA 3 13 72

RED DEER 2 27 23

INNISFAIL 3 23 72

KNEE HILL 3 18 09

CALGARY 18 18 15

BANFF 11 20 58

MACLEOD 13 11 73

LETHBRIDGE 1 28 13

PINCHER CREEK 4 28 42

COLLES 16 88

MEDICINE HAT 13 14 08

SWIFT CURRENT 17 15 67

CRANE LAKE 2 17 11

REGINA

MUSKOPETUNG 2 16 85

QU'APPELLE 19 17 10

INDIAN HEAD 1 16 87

GRENFELL 3 13 48

WALLACE 3 19 70

KILNAP 5 12 08

CRESCENT LAKE 2 22 31

SALTCOATS 13 15 87

ODNIKUP 2 17 84

GLEN ADELAIDE 3 18 34

CANNINGTON MANOR 4 19 34

ALAMEDA 2 14 46

120 115 110 105 100 95 55 50

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Report on the North West of Canada, with special Reference to Agricultural Production.

I.—Outline of the Geology and Physical Geography of the North West.

Geology.

The North West may, from the point of view of geology,* be divided into three regions of unequal area, and dissimilar characters:—

1. The Laurentian "rim."
2. The Palæozoic "belt."
3. The Tertiary and Mesozoic slope, or "trough."

1. *The Laurentian "rim."*—The eastern shore of Lake Winnipeg, which forms for three-fourths of the distance the eastern boundary of the North West, constitutes at this point the western edge of the Laurentian, or Archæan, shield, which forms the crust of more than one-half of the Canadian portion of the American continent.

2. *The Palæozoic "belt."*—Upon the Laurentian there lies a "belt" of varying width of *Palæozoic* rocks. This belt curves north-westwards, and "reappears, crumpled and broken, in the Rocky Mountains."†

3. *The Tertiary and Mesozoic Slope.*—Resting upon the Palæozoic strata, and extending from about long. W. 100° obliquely north-westwards, are the *Tertiary* and *Mesozoic* formations of the interior continental plateau.

"Taken as a whole, the central plain . . . . may be regarded as a great shallow trough, of which doubtless, owing to post-tertiary differential uplift, the western part of the floor is now higher in actual elevation than its eastern Laurentian rim. . . . . The whole area has been one rather of deposition than of denudation, up to a time geologically recent, and has very lately been levelled up still further by superficial deposits due to the glacial period."†

Physical Geography.

1. *The Laurentian formation,* whose edge constitutes the eastern rim of the western region, does not properly belong to the North West. It may be noticed, however, that the Laurentian area is generally characterised on its western margin by rocky land, covered with thin humus in the lower levels. The country is nowhere mountainous; but rocky uplands covered with timber, extend for from 40 to 70 miles northwards from the north shore of Lake Superior to the height of land. From this point the rivers drain through a flat country northwards to James Bay.‡

2. *The Palæozoic belt,* between the Archæan shield and the Tertiary and Mesozoic, forms the eastern portion of the interior continental plateau. Its southern part is occupied to the extent of about one-fourth of its area by Lakes Winnipegosis and Manitoba. The region lying to the east, between

* The literature of the geology of the North West is to be found in the Annual Reports of the Geological Survey of Canada, and in separate papers by members of the staff of the Survey, especially in those of the late Dr. G. M. Dawson, whose paper on "The Geology and Physical Geography of Canada" in the "Handbook of Canada," issued for the use of the members of the British Association, 1897, is a masterly summary.

† Dawson, Dr. G. M., "The Geology and Physical Geography of Canada (Handbook of Canada)."

‡ A general account of this region is to be found in "Report of Progress on the Explorations and Surveys up to January 1874, Canadian Pacific Railway," Sandford Fleming, Engineer-in-Chief, Ottawa, 1874, p. 9. The region has more recently been extensively traversed, and a portion of it is now being surveyed, with a view to the construction through it of the new Grand Trunk Pacific Railway.

these lakes and Lake Winnipeg consists of marsh land or muskeg, while the region to the west, between the lakes and the Tertiary, is relatively drier, and is practically the beginning at that point of the prairie region.

3. The Interior Continental Plateau extends northwards in a roughly triangular form whose base, so far as Canada is concerned, is Lat. N. 49°, and whose apex is Lat. N. 62°, the triangle leaning westwards. The length of the base is about 800 miles, while at Lat. 56° the width is about 400 miles.*

This plateau may be described also as an inclined plane (or series of three inclined planes or steppes), whose lower edge rests upon the Laurentian "rim" to the eastwards, and whose upper edge, about 2,000 feet higher than the lower, rests upon the Palæozoic rocks of the Rocky Mountains to the west. The average descent from west to east, is over five feet per mile. This descent, extended as it is over about 800 miles, sufficiently accounts for the rapidity of the rivers,* and for the great depth of some of their channels.

Although denudation has occurred, the waste has taken place approximately equally over the whole surface, and this, apart from local instances of erosion, accounts for the comparative uniformity of the prairie levels. The prairie region may, however, also be considered as consisting of three slopes or steppes, separated by more or less abrupt escarpments †

(*a.*) The lowest level occupying the extreme east of the region, partly on the Palæozoic and partly on the Tertiary, contains an area of about 55,000 square miles. The northern and greater portion is almost covered by the Winnipeg Lake system, while the southern portion of about 7,000 square miles contains the bed of the glacial "Lake Agassiz," whose deposits form the fertile prairie lands of Manitoba.

The western boundary of this slope is formed by a disconnected range of hills—Pembina Mountain, Riding and Duck Mountains, and Porcupine and Pasqua Hills. Beyond these hills to the west lies the second slope or steppe.

(*b.*) The second slope or plain, known as the Missouri Côteau, contains about 105,000 square miles, more than 50,000 square miles being open prairie. The surface undulates especially in the more northerly part, and the river valleys are deep and wide.* The mean elevation is about 1,600 feet, or 600 feet higher than the first slope. The southern portion is scantily supplied with timber, but there are great quantities of black poplar with some spruce in the more northerly portion.

(*c.*) The highest slope, extending from the western edge of the second, to the Rocky Mountains has a mean altitude of 3,000 feet, and an area of 134,000 square miles. Uniform as the surface appears to a casual observer from the main line of the Canadian Pacific Railway, it is really more irregular than the surface of either of the two other slopes. The effects of denudation are here more obvious, deep ravines and coulées having been cut in the soft cretaceous and tertiary rocks.* The southern portion of this slope is like that of the others, open and treeless prairie, while the northern portion towards the Saskatchewan valley is frequently well wooded. The Cypress Hills and Wood Mountain, which occur in the southern portion of the slope "must be regarded as outlying remnants of an older plain of the "Tertiary period."* The whole of the great plain is thickly covered with glacial deposits.* To the south of the Canadian plains lie the plains of the Dakotas and Montana, and to the north, the forests, broken by innumerable lakes and rivers, extend to the "Barren Lands."

II.—The Continental Plateau.

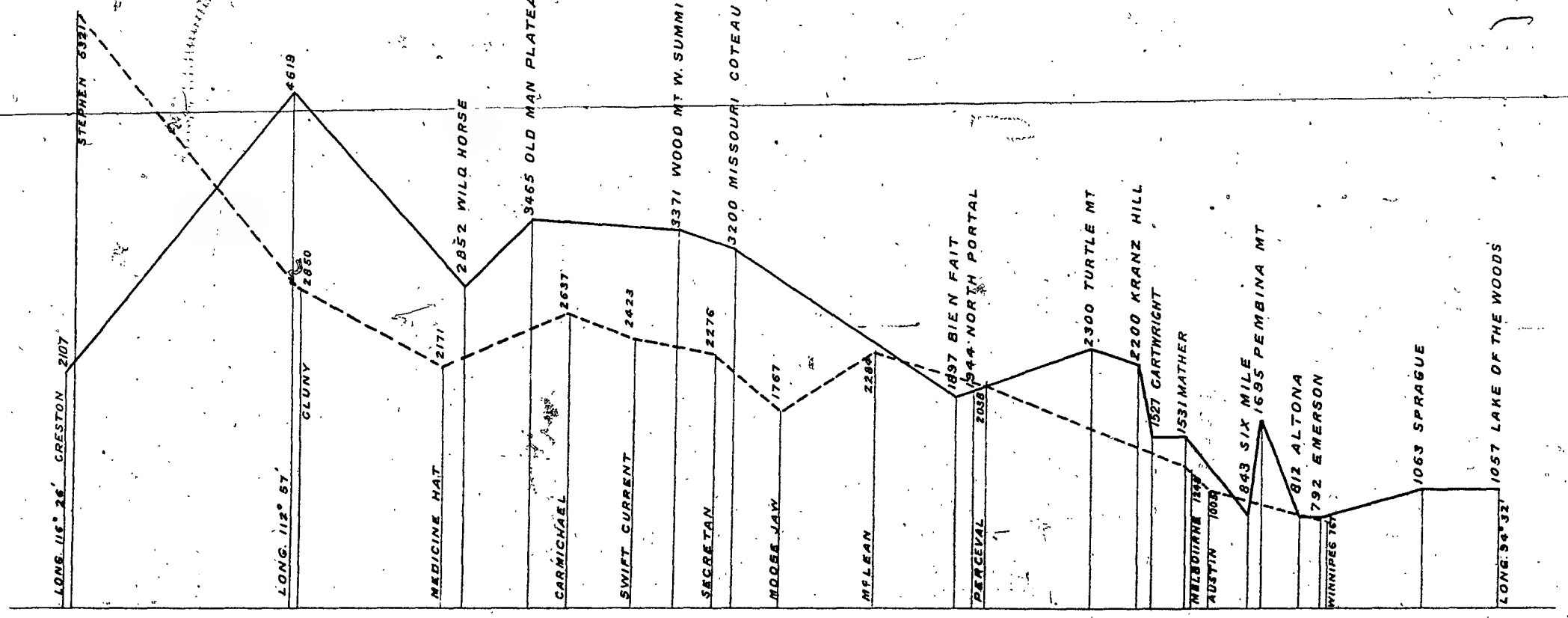
(i.) Summary of Land Surface Features.

The continental plateau upon which stretch the great plains of the North West, having been described in general terms, must now be considered as regards the features of the land surface. The open prairie extends from the

* Dawson, Dr. G. M., "The Geology and Physical Geography of Canada (Handbook of Canada)."

† *See* Chart showing profiles opposite, and map at end of volume.

CHART SHOWING THE PROFILES OF THE BOUNDARY LINE (49° LAT. N.) AND OF THE MAIN LINE OF THE CANADIAN PACIFIC RAILWAY BETWEEN WINNIPEG AND THE ROCKY MOUNTAINS.



BLACK LINES — ELEVATIONS ALONG THE BOUNDARY LINE.
RED DOTTED LINES — ELEVATIONS ALONG THE MAIN LINE OF THE C.P.R.

HORIZONTAL SCALE 0·01 INCH = 1' OF LONGITUDE ON LAT. 49° = 0·7578 STATUTE MILES. OR 0·6578 GEOGRAPHIC MILES.
VERTICAL " 0·01 INCH = 1 FOOT
MEAN DISTANCE OF THE C.P.R. NORTH OF LAT. 49° — 90 MILES.

NOTE.—This chart has been drawn for the purposes of this Report by Mr Blake of the Meteorological Service. The altitudes are taken from "Altitudes in the Dominion of Canada", Ottawa, 1901, & "Dictionary of Altitudes in the Dominion of Canada", Ottawa, 1903, both by Mr James White, F.R.G.S. Dominion Geographer.

5222 4.05.

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Red River Valley to the foothills of the Rocky Mountains, and from the International Boundary (Lat. N. 49°) to the North Saskatchewan Valley, projecting itself north-westwards, irregularly to the Peace River in Athabasca. This prairie varies greatly in character. It comprises treeless level stretches almost without indentation in the south-east; in the south-west the prairie is broken by frequent indentations—ravines and coulées; while in the north there are similar indentations, with occasional slight eminences giving the effect of rolling country with park-like timbered lands at frequent intervals. The forest-region extends from the Winnipeg Lake system north-westwards along the north bank of the North Saskatchewan River and down the valley of the Mackenzie River almost to the Arctic Sea. From this description it will be realised that while the southern prairies are by no means unbroken (there are indeed many picturesque valleys, for example, the Qu'Appelle Valley and the valleys of the Bow and St. Mary's rivers) the northern region is much more diversified. The valley of the North Saskatchewan, for example, at intervals is extremely fine. The frequent hills are covered with timber and the level stretches of prairie afford distant views sometimes of great beauty.

The interleaved chart shows the elevations (*a*) on the International Boundary, lat. N. 49°, and (*b*) on the main line of the Canadian Pacific Railway between Winnipeg and the Rocky Mountains. It exhibits graphically the changes in level and the general upward tendency from east to west.

(ii.)—General Account of the Land Surface and Economic Features.

We have now to consider in more detail the characters of the three great plains or slopes into which, as the account of the physical geography of the region has shown, the continental plateau is divided.

1.—*The Eastern Prairie Slope.*

This slope extends from the Red River Valley westwards to the broken range of hills extending from Pembina Mountain obliquely northwards. The region is drained by an immense number of rivers, most of which are tributaries of the Assiniboine. This great river joins the Red River at Winnipeg and flows into Lake Winnipeg, the waters of which ultimately find their way into Hudson Bay.

The eastern slope may conveniently be divided into two sub-divisions, south and north-west.

(*a.*) *The Southern portion of the Eastern Slope.*—This portion comprises the fruitful and long-settled Red River Valley and the valley of the Assiniboine from a point immediately to the west of the Portage Plains to the junction of the two rivers. Here is the nucleus of the North West. At the present time the bulk of the population and a large proportion of the production are to be found within this area. It consists of great stretches of level prairie, divided into farms, cultivated for the most part, and largely enclosed in wire fences. Formerly traversed in every direction by prairie trails, the road allowances are now defined, running north and south and east and west. These roads consist, as a rule, simply of the prairie soil packed hard by traffic. During a great part of the year they are fairly good; but especially in the more northerly portion of the sub-division they are impassable for heavy traffic in the spring and in wet years during a portion of the fall. When the roads are hardened by a touch of frost they are good again until the winter snow makes them quite first rate. This sub-division is provided with railways and wheat elevators to a greater extent than is any other portion of the North West. Main and branch lines bring railway communication within reach of the farmers in all the important farming centres. Here all the good land has passed into private ownership. The whole area has been surveyed, and the character of every part of it is thoroughly understood.

The soil is so rich that in spite of 20 years of cropping, some of it accomplished to a large extent by indifferent farming, especially in the earlier days, there is still little sign of soil exhaustion. The average yield per acre over the whole area is greater than elsewhere in the North West. When one speaks of Manitoba conditions, one thinks of this particular part of the province.* The specialist wheat producer, the specialist breeder of

* *See* p. 35 *et seq.*

high class stock, the dairy farmer, and the farmer who carries on mixed farming, are alike to be found in this region. Here also are to be found self-contained village groups, and the country towns with their farmers' institutes, their local interests and politics, their school system, their musical societies, their numerous churches, and even a certain amount of gaiety.

Here also is the city to which, in a sense, the whole of the North West is tributary. Winnipeg lies as it were in the neck of the bottle, for through a comparatively narrow pass between the southern shore of Lake Winnipeg and the International Boundary the whole eastward traffic of the North West must go.*

The special needs of the southern portion of the eastern slope may be regarded as consisting of (*a*) increase of agricultural skill†; (*b*) the further development of railway facilities‡; (*c*) the control of the waters of the Assiniboine, which in spring frequently produce disastrous floods in the Portage Plains; (*d*) drainage of the marsh lands; and (*e*) provision of means for dealing with the occasional outbreaks of "rust" in wheat. The damage from early and late frosts, and the ravages wrought by occasional storms of sleet, are to be insured against rather than prevented.§

(*b.*) *The North Western portion of the Eastern Slope.*—This portion is much more broken than the southern. The tract lying between Lake Manitoba and the Riding Mountains consists of stretches of good prairie land with frequent tree-covered marshy flats. Northwards, towards the Duck Mountains, the prairie lands increase in extent to the Swan River, where the country is broken by bluffs or timbered heights of black poplar, spruce, and pine. Beyond Swan River the forest country begins, and stretches indefinitely northwards. Since 1896, when the Lake Manitoba and Dauphin Railway was constructed, a large population‖ has settled in this region. While a considerable portion of the country is suitable for mixed farming, and while it even now sustains a large population, it cannot at present be regarded as an important factor in wheat production, for reasons which will appear more fully later.¶

2.—*The Missouri Côteau, or Middle Prairie Slope.*

This area, about 600 feet higher than the preceding, may be sub-divided into south-eastern, south-western, and northern sub-divisions.

(*a.*) *The South-Eastern Sub-division.*—In general character this region is not unlike the southern portion of the lower slope; but towards the north the prairie becomes more rolling, and broken with low-growing timber. Railway development has been going on in this district with considerable energy. Seven parallel lines, with numerous connections, bring railway communication within moderate distance of the average farm.

So far as concerns wheat cultivation, this region may be held to rival, if not, in the rapidity of its development, to excel, the southern portion of the lower plain. It comprises, for example, the rich Deloraine district of Southern Manitoba, the district of Brandon, where wheat-growing on a large scale has been brought to a high pitch, and the prosperous district of Minnedosa.

(*b.*) *The South Western Sub-division.*—This sub-division comprises the greater part of the eastern portion of the Territory of Assiniboia. It consists of rolling prairie with occasional slight elevations, broken by numerous river valleys, some of which (*e.g.*, the valley of the Qu'Appelle) are deep and wide, with timbered slopes. There are numerous lakes of moderate size, but no large waters. Throughout the region, excepting in the valleys, there is little natural growth of timber; but the farmers, with the encouragement of the Government, are planting trees and shelter hedges to some extent.** The soil over a large part of the centre of the district is a stiff very deep clay, rather difficult to work, but productive when well cultivated and when the seasons are favourable in respect to moisture.†† Scattered throughout the region are several small Indian Reserves.

---

* The development of Winnipeg as a centre of wholesale trade is treated elsewhere. *See* p. 22.

† *See* p. 35.

‡ *See* p. 92 *et seq.*

§ *See* p. 45.

‖ *See* p. 95.

¶ *See* p. 15.

** *See* p. 78.

†† *See* p. 27.

The land situated along the main line of the Canadian Pacific Railway began to be settled in a serious sense about 1884*; and later, settlers established themselves in numbers in the Qu'Appelle valley and other districts at distances up to 25 or 30 miles from the railway.

The seasons were, however, dry, and for a time conditions were otherwise unfavourable. Farming on an extensive scale was attempted, for example, at the Bell Farm, near Indian Head; but from various causes the large farms were unsuccessful. In 1896 the mining *furore* in British Columbia drew off some farmers, and farms were abandoned for this reason, or because of disappointment at the results of cultivation.

Since 1896, however, the aspect of the country has changed. The seasons from 1899 have as a rule been moist, and the stream of immigration has brought large numbers of settlers into the district. New lines of railway have aided in its development, and extensions are projected. In a very few years, should the seasons continue fairly favourable, this region must be as well settled and developed as southern Manitoba. The districts that have come into prominence during the past few years are the district round Regina, especially towards the south, the Weyburn district, into which a large part of the immigrants from the United States have gone, the Arcola district, and the new line of the Kirkella branch towards the Pleasant Hills, whilst Indian Head has become a great wheat-producing region. Settlement is pushing northwards as well as southwards, and the country is rapidly being filled up, partly by new immigrants and partly by migrants from Manitoba.

(*c.*) *The Northern Sub-division.*—The northern portion of this region consists, as regards its southern part, of rolling prairie, with occasional marshes, and, as regards its northern part, of open prairie, with frequent patches of wooded land (principally black poplar) and wide valleys, *e.g.*, the Swan River Valley. These valleys have long, gentle, sloping sides, with occasional broad meadows. Throughout this region westwards, from the Duck and Riding Mountains, there are extensive areas of good farming land. The settlement of this part of the country cannot be said to have begun seriously until 1899, when a large number of Russian immigrants† took up land to the west of the Duck Mountains. Since then the Canadian Northern Railway has constructed a line, not yet fully open, westwards from Dauphin. The other outlets at present for the produce of the region are from Swan River on the Canadian Northern, and from Yorkton on the Canadian Pacific Railway. As regards wheat cultivation, this area is not at present important, nor is it possible to say with any certainty that it is likely to become important for some time to come.‡

The special problems of the northern half of the middle slope are, (*a*) the means of increasing the population by immigration, in order to bring the available land into cultivation, (*b*) the provision of railway facilities,§ and (*c*) the improvement of the prairie trails and drainage of the marshy lands.

3.—*The Highest or Western Prairie Slope.*

The most westerly of the three slopes has a mean elevation of about 3,000 ft., 1,400 ft. higher than the middle slope, and about 2,000 ft. higher than the eastern one. The region as a whole may be divided into two parts—

(*a.*) The southern sub-division, or semi-arid area.

(*b.*) The northern sub-division.

(*a.*) *The Semi-arid Area.*—The semi-arid area "is bounded on the "south by the International Boundary, on the east and north by a line "commencing at the intersection of Long. W. 102° with the International "Boundary, and running from thence north-westerly to Lat. 51° 30′, and "thence west to the Rocky Mountains; and on the west by the Rocky

* Although there were isolated settlers earlier.

† *See* p. 15.

‡ *See*, however, pp. 16 and 17.

§ *See* p. 92.

"Mountains. This portion of the territories contains about 80,000 square "miles or upwards of 50,000,000 acres."*

The causes of the aridity of the western plains of the United States and of the similar conditions of the area in Canada as above defined have been discussed by geologists and meteorologists in the United States and in Canada without any thoroughly satisfactory conclusion having been arrived at.† It would appear that there is a general impression "among geologists that the topographical relief is an important factor"; but, on the other hand it is pointed out that desiccation occurs "on both sides of many of the mountain ranges."‡

Even if it be admitted that the desiccation which is going on in all the continents consists in the drying-up of the beds of post-glacial lakes,§ the process of drying-up has still to be accounted for.

It may be that the desiccation of the area in question is "due to features "connected with the general circulation of the atmosphere on the northern "hemisphere, which are remotely connected with the distribution of land "and water."‖ It may also be that the Chinook or warm wind—corresponding to the Föhn of Switzerland—dried as it passes over the Rocky Mountains, scorches the surface of the plains in their lee, and thus plays an important part in producing aridity locally.¶

In any case it seems fairly certain that while the mediate causes of the desiccation of this portion of the plains are connected with atmospheric movements, there are behind these, remoter geological changes which have produced the conditions under which these atmospheric movements bring about the observed effects.**

In the present state of knowledge upon the question there seems to be no certain ground for believing that the desiccation of the area is now progressing and is due to remorseless and inevitable causes which, though operating slowly, nevertheless produce appreciable effects within comparatively limited periods of time.††

(*b.*) *The Northern Portion of the Western Prairie Slope.*—Fringes of woodland mark the northern limits of the semi-arid region. The northern portion of the western prairie slope is well watered by frequent rainfall, and is traversed by the two branches of the Saskatchewan and by Battle River. The general level of the country is a high rolling plateau with occasional ranges of hills and deep and wide valleys. North of the North Saskatchewan lie forests into which settlement is slowly penetrating. The settlement of the district practically began round two important posts of the Hudson's Bay Company—the post at Prince Albert and that at Edmonton, both situated on the Saskatchewan River, and distant from one another about 400 miles. Between these posts, and also on the Saskatchewan River, is the town of Battleford, which is situated on the margin of the semi-arid area. This town was until 1883 the headquarters of the North West Mounted Police, and the capital of the North West Territories. On the construction of the Canadian Pacific Railway across the plains Regina became the capital.

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* Dennis, J. S., General Report on Irrigation and Canadian Irrigation Surveys, 1894, Ottawa, 1895, p. 4.

† The phenomenon of desiccation appears in all the continents, and its causes are everywhere subject of speculation. The importance of a thorough study cannot be over-estimated, not only because of the light it would throw upon past migrations, but also because it would contribute to intelligent administration of populations migrating in the present.

‡ Professor T. C. Chamberlin, of the University of Chicago, in a private letter. *See also* his paper on "An Attempt to Frame a working Hypothesis of the cause of Glacial Periods on an Atmospheric Basis," American Journal of Geology, Vol. VII., 1899, pp. 752–771.

§ As ingeniously suggested by Prince Kropotkin in "The Desiccation of Eur-Asia" in the Geographical Journal, June 1904.

‖ As suggested by Professor Chamberlin in a private letter. *See also* his paper cited above.

¶ *See* Stupart, R. F., Director of the Dominion Meteorological Service, "The Climate of Manitoba and North-West Territories." Toronto, 1904, [privately printed], p, 2.

** While thus, for example, disappearance of the forests may have been an incident in, rather than a cause of, desiccation, it may also be that planting of trees in the desiccated area might not only be possible but very advantageous in contributing at least to the protection of the land surface against desiccating atmospheric influences.

†† The meteorological conditions, as well as the utilisation and improvement of the semi-arid area, are treated elsewhere. *See* pp. 8 and 48.

A great part of the large area between the latitude of Edmonton and the northern limit of the semi-arid area consists of land very suitable for mixed farming, although large intervening areas cannot be utilised until extensive systems of drainage are adopted. The northern plateau may, however, in general be regarded as highly susceptible of compact settlement. As yet only those portions which adjoin the lines of the Calgary and Edmonton and Qu'Appelle, Long Lake, and Saskatchewan Railways have been at all closely settled; but settlements are extending rapidly at distances of from 30 to 50 miles on either side of these lines.

(iii.)—The Climate of the Continental Plateau.

1.—*The Climate of the Plains as a whole.*

The meteorological service of the Dominion, which has its headquarters at Toronto, Ontario, under the care of Mr. R. F. Stupart, has altogether 62 observing stations in the North-West Territories, and 28 in Manitoba, a total of 90 stations in the North West. Most of these stations have records for 20 years, while Winnipeg has records for 30 years.*

The meteorological conditions exhibit considerable variety over the region. The temperature is relatively higher in winter and spring, and lower in summer, in the foot-hills of the Rocky Mountains and on the plains of Western Alberta than on the eastern plains. The precipitation is greater on the eastern than on the western plains.

Spring.—The average daily maximum temperature in April at Calgary is 53° F., at Edmonton 52°, at Medicine Hat 58°, while at Winnipeg it is 47°, showing a temperature warmer by about 5° in the West than in the East. This means earlier freedom of the ground from frost and earlier seeding. The dates of the first occurrence in each year of sowing, hay-cutting, and grain cutting are given since 1902 in the annual Reports of the Meteorological Service.

Table showing dates of First Occurrence of Sowing, Hay Cutting, and Grain Cutting in the North West in each year from 1900 to 1904.†

Stations.	Sowing.	Hay Cutting.	Grain Cutting.
1900.			
Alberta	—	—	August 20.
Assiniboia and Saskatchewan	—	—	August 20.
Manitoba	April 2	—	August 6.
1901.			
Alberta	March 28	—	August 12.
Assiniboia and Saskatchewan	—	—	—
Manitoba	April 3	—	August 4.
1902.			
Alberta	March 29	July 1	August 18.
Assiniboia and Saskatchewan	April 13	July 7	August 22
Manitoba	April 23	August 3	August 12.
1903.			
Alberta	April 8	—	August 20.
Assiniboia and Saskatchewan	April 6	July 20	August 10.
Manitoba	April 6	July 10	August 5.
1904.			
Alberta	April 18	July 23	August 20.
Assiniboia and Saskatchewan	April 30	—	August 13.
Manitoba	April 25	July 20	August 15.

* Stupart, R. F., "The Climate of Manitoba and North-West Territories." Toronto, 1904.

† Report of the Meteorological Service of Canada, by R. F. Stupart, Director, Ottawa, 1903, supplemented by data from unpublished records of the Meteorological Service.

Throughout the region the spring is short and it is necessary for the farmer to utilize to the full every day from the last days of March until the end of April. By the end of April all seed ought to be in the ground in order that the warm, moist days of the early summer may contribute to its speedy germination.*

Summer.—The temperature continues to rise in May, and about the middle of that month the heaviest rainfall of the year begins. During June, July and August the temperature still rises, the daily hours of sunshine increase, while hot days, when the temperature reaches nearly 100°, occur occasionally. The mean maxima for July are as follows, Winnipeg 78°, Qu'Appelle 76°, Medicine Hat 82°, and Calgary 75°. The mean minima indicate cool nights. The isothermals shown in the accompanying map (*see* opposite) indicate that the summer is nearly as warm in the territory of Athabasca and in the valley of the Mackenzie as it is in Alberta. The sunshine chart (*see* opposite) indicates also the greater duration of sunshine as higher latitudes are approached.†

TABLE showing AVERAGE NUMBER of HOURS of BRIGHT SUNSHINE in each Month of the Year at VARIOUS STATIONS.

No. of years.	Stations.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
		hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs	hrs.	hrs.	hrs.
	Lat. 50°. -	266	282	369	413	479	488	491	441	378	337	271	252	4467
8	Battleford	89·6	133·2	177·8	218·3	230·7	256·5	276·9	247·7	172·6	154·2	86·2	68·1	2112·5
10	Indian Head -	76·9	99·8	125·9	161·9	226·9	205·6	265·2	215·5	144·1	124·4	67·9	61·2	1775·3
12	Brandon -	107·2	132·0	157·7	183·5	229·1	223·3	274·1	252·1	172·6	131·2	89·1	87·2	2039·1
22	Winnipeg	114·7	136·8	181·6	203·7	254·9	256·9	285·9	256·9	175·8	127·4	93·6	88·4	2176·6

Autumn.—The fall in the North West may be said to begin in September. Whenever the harvest is over, ploughing must begin without delay, for the autumn, like the spring, is very brief. The average mean highest temperature in September is about 10° lower than the similar average for August; and the average for October is 10° lower still.

Winter.—In November winter may be said to begin. The temperature falls to about 20° below the average of October. In December the temperature is from 5° to 12° lower than in November. The January temperature is lower from 8° to 10° than the December temperature. The February average is higher by from 4° to 12° than the January average, and the March average is still higher by from 1° to 15°. Before the end of March winter may be said to be over and the spring on the eve of commencing. The following may be regarded as the calendar.

Spring -	- April.
Summer -	- May, June, July, August and first half of September.
Autumn -	- Second half of September, October, and first week in November.
Winter -	- From second week in November, December, January, February and March.

This applies practically to the whole of Manitoba, Alberta, Assiniboia and Saskatchewan.

2.—*The Meteorology of the Semi-arid Area.*

Meteorological observations in the semi-arid area began in 1883, so that there is available a series of observations over at most 20 years. This period is unquestionably too short to justify decisive conclusions upon the meteorology of the region‡. Observations have been conducted at the following stations:—Calgary since 1885, Gleichen since 1885, Medicine Hat since 1883, Maple Creek since 1884, Swift Current since 1886, Chaplin since 1883,§ Regina since 1883. In addition to the observations made at above

* On early sowing. *See* p. 38.

† It will be realized that the North West extends from lat. 49° northwards.

‡ The map facing p. 10 shows the number of years of observation, and the mean annual precipitation at certain places. The years of observation are not in all cases continuous. The mean annual precipitation is calculated for the number of years of actual observation.

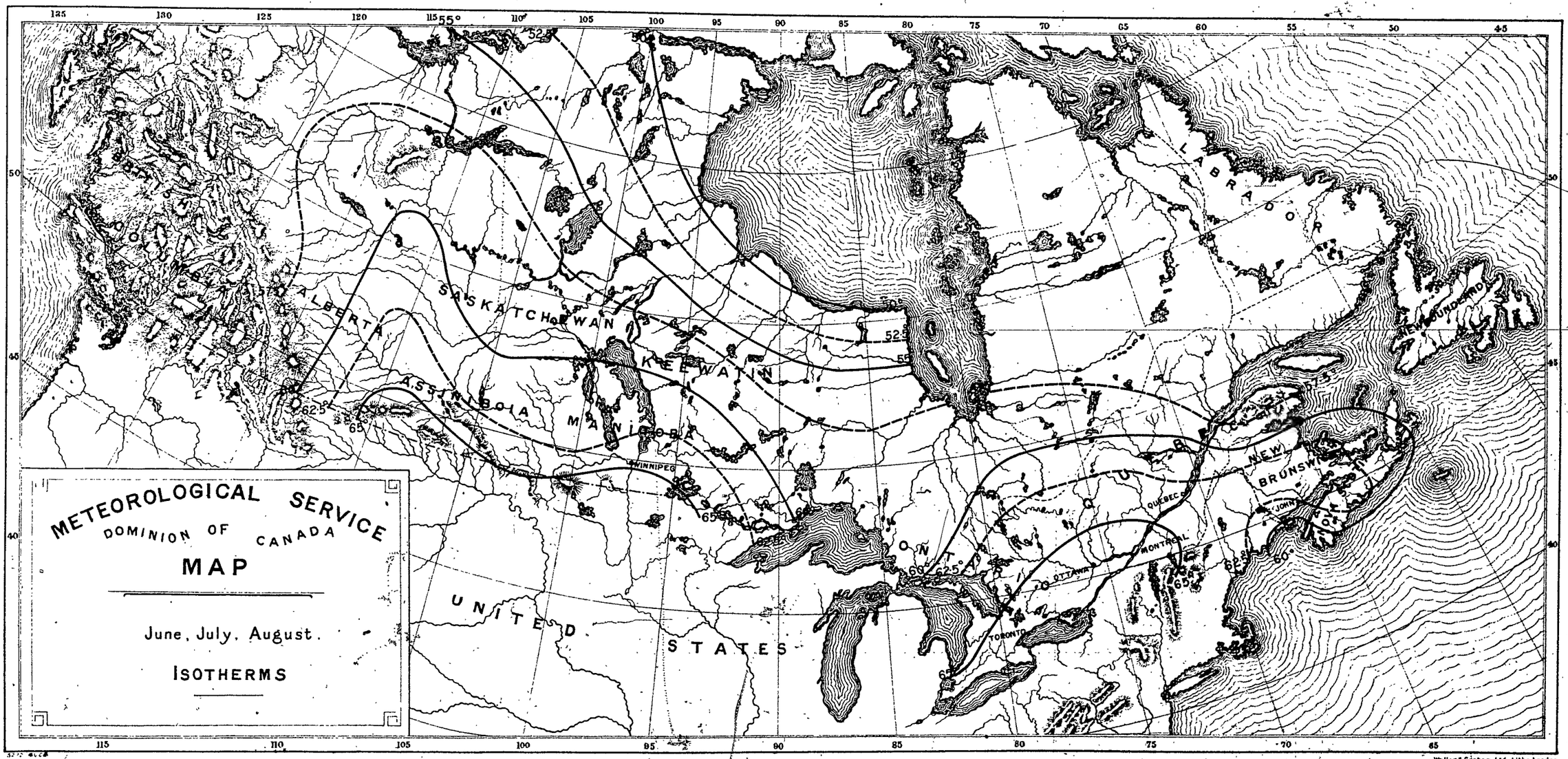
§ The statistics of precipitation at Chaplin given in the original table have recently been cancelled by the Meteorological Service, and are for this reason omitted in this and in the following tables

METEOROLOGICAL SERVICE
DOMINION OF CANADA

MAP

June, July, August.

ISOTHERMS



Waller & Graham, Ltd Litho. London.

DURATION OF SUNSHINE. (Number of hours that the Sun is above the horizon.)

LATITUDES 44 TO 64

MAY | JUNE | JULY | AUGUST

5th 10th 15th 20th 25th 30th | 5th 10th 15th 20th 25th 30th | 5th 10th 15th 20th 25th 30th | 5th 10th 15th 20th 25th 30th

Duration

Hrs.

21 ½ 20 ½ 19 ½ 18 ½ 17 ½ 16 ½ 15 ½ 14 ½ 13

64° 62° 60° 58° 56° 54° 52° 50° 44°

LATITUDE

64° 62° 60° 58° 56° 54° 52° 50° 44°

MAY | JUNE | JULY | AUGUST

5th 10th 15th 20th 25th 30th | 5th 10th 15th 20th 25th 30th | 5th 10th 15th 20th 25th 30th | 5th 10th 15th 20th 25th 30th

Duration

Weller & Graham, Ltd Litho. London.

stations on rainfall, temperature, barometric pressure, &c., a short series of evaporation experiments has been conducted since 1896. These experiments were made at Calgary in 1896, 1898, 1899 and 1900; at McCaskill Lake in 1899; at Nanton in 1899, and at Mosquito Creek in 1899.*

Study of the details of the meteorological reports shows that if one takes the average annual precipitation of rain and snow over the periods of observation, there can be no doubt that there has been sufficient total rainfall for the growth of crops†; yet the distribution of that rainfall throughout each year, and over the years, is such that not only in certain years is there a deficiency but that on the average in the months of May, June, July and August, when rain is required for plant growth, there is in each observed case a deficiency of rainfall.‡

The following tables point, if not to a definite cycle, at least to great variation in the rainfall conditions.

TABLE showing the AVERAGE ANNUAL PRECIPITATION at STATIONS within the SEMI-ARID AREA.§

Stations.	Number of Years of Observation.	Total Average Annual Precipitation in Inches.
Swift Current	16	15·591
Medicine Hat	18	14·180
Calgary	17	15·084
Macleod	6	13·638

TABLE showing the AVERAGE ANNUAL PRECIPITATION during MAY, JUNE, JULY, and AUGUST, at the same STATIONS.§

Stations.	Number of Years of Observation.	Total Average Annual Precipitation in Inches.			
		May.	June.	July.	August.
Swift Current	16	1·764	2·720	2·556	1·826
Medicine Hat	18	1·598	2·743	2·107	1·613
Calgary	17	0·776	2·722	2·751	2·022
Macleod	6	1·772	2·182	2·173	1·608

TABLE showing the AVERAGE MEAN HIGHEST and LOWEST TEMPERATURE at the following STATIONS.§

Station.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
						AVERAGE MEAN HIGHEST TEMPERATURE.						
Calgary	21·9	34·3	35·9	52·6	63·6	68·9	74·9	73·7	63·7	54·9	35·9	30·1
Edmonton	15·2	19·2	34·0	52·2	65·1	69·7	73·4	72·0	62·1	52·6	31·5	23·1
Medicine Hat	20·8	21·6	36·7	57·7	68·6	74·8	81·9	80·9	69·0	58·4	38·4	29·4
Prince Albert	6·6	10·2	25·3	50·1	63·8	70·6	74·7	72·9	62·1	49·5	25·7	15·1
Qu'Appelle	7·2	9·3	28·7	48·5	64·1	72·3	76·3	74·7	63·8	50·3	28·2	16·2
Winnipeg	5·4	10·4	24·6	46·6	65·1	74·5	78·3	75·9	64·7	50·2	27·8	14·6
						AVERAGE MEAN LOWEST TEMPERATURE.						
Calgary	0·0	1·8	12·4	26·7	35·7	42·4	46·5	44·9	36·8	28·1	13·9	10·8
Edmonton	− 4·5	− 1·6	11·2	28·5	38·3	44·0	47·9	46·3	37·2	29·7	13·7	5·9
Medicine Hat	− 0·4	2·8	14·1	31·0	41·4	47·8	53·3	50·9	40·7	31·6	16·3	9·4
Prince Albert	−17·0	−14·8	− 2·2	23·6	35·3	44·0	48·9	45·1	36·1	26·4	6·1	− 6·7
Qu'Appelle	−10·8	− 9·6	4·0	26·7	37·9	47·0	51·0	48·9	39·1	29·8	10·8	− 0·7
Winnipeg	−16·2	−12·6	0·5	25·3	39·0	49·7	53·8	50·5	41·0	29·8	10·0	− 5·8

* For results in detail, *see* Irrigation in the North West Territories of Canada 1902, Department of the Interior. Ottawa 1903, p. 27.

† For an account of the climate of the southern portion of the semi-arid area, from a medical point of view, *see* Kennedy, G.A., M.D., Fort McLeod, Alberta, "The Climate of Southern Alberta and its relation to Health and Disease" in the Montreal Medical Journal, Montreal, 1889, Vol. XVIII., p. 247.

‡ Irrigation in the North-West Territories of Canada 1902, Department of the Interior, Ottawa 1903, p. 24.

§ Figures supplied by the Dominion Meteorological Service.

TABLE showing the MEAN MONTHLY RAINFALL.*

Station.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Calgary	0·00	0·00	0·00	0·30	1·93	3·03	3·02	2·22	1·18	0·19	0·00	0·00	11·87
Edmonton	0·05	0·00	0·06	0·50	1·76	2·82	3·47	2·04	1·39	0·32	0·05	0·08	12·54
Medicine Hat	0·01	0·02	0·11	0·43	1·62	2·83	2·13	1·55	1·14	0·43	0·15	0·08	10·50
Prince Albert	0·00	0·02	0·10	0·40	1·35	2·68	2·21	2·11	1·27	0·56	0·11	0·00	10·81
Qu'Appelle	0·00	0·01	0·03	0·37	1·59	3·48	2·55	1·56	1·27	0·48	0 04	0·01	11·39
Winnipeg	0·00	0·00	0·25	1·17	2·15	3·53	3·08	2·63	2·09	1·52	0·17	0·14	16·73

TABLE showing EXTREMES of TOTAL ANNUAL PRECIPITATION in Inches at STATIONS in the NORTH WEST.*

Stations.	Year.	Smallest.	Year.	Greatest.
Swift Current	1889	10·46	1891	24·55
Medicine Hat	1886	6·72	1899	22·28
Calgary	1892	7·91	1899	26·15
Macleod	1900	10·08	1899	19·74

TABLE showing CYCLE of LEAST and GREATEST PRECIPITATION.

Stations.	Number of Wet Years.	Number of Dry Years.
Swift Current	11	6
Medicine Hat	13	7
Calgary	11	8
Macleod	2	4

It would appear that there was a series of years from 1892 to 1895 in which the rainfall was deficient, and a series of years from 1896 to 1903 in which it was adequate for the growth of crops.

We have now to turn to the question of evaporation. Experiments on this subject have not been carried on for a sufficient length of time to justify absolute confidence in the results, yet so far as they go, they seem to agree generally with similar experiments and observations carried on in the area of the United States immediately to the south of the Canadian area in question.†

The general results of these experiments is that there is no observable relation between the amount of precipitation and the amount of evaporation. The subject is of practical importance so far as this area is concerned, in respect that there is in some years a very small margin, and in other years no margin at all. On the contrary there is in some years a considerable excess of evaporation over precipitation.†

The general conclusion of the whole matter, as drawn by Mr. J. S. Dennis,† seems hard to contest, viz., that there is a cycle, whose periodicity has perhaps not yet quite been determined, in which there is a certain number of dry years, from three to six, and a certain number of relatively wet years, also from three to six; and that the recurrence of these seasons alternately may be expected by all those who settle in the region.

During the past eight years, from 1896 to 1903, this part of the country has enjoyed the advantage of relatively wet seasons, and it follows, should Mr. Dennis' conclusion be correct, and there seems no reason to doubt its substantial accuracy, that a series of dry years may now be anticipated.‡

* Figures supplied by the Dominion Meteorological Service.

† Irrigation in the North-West Territories of Canada 1902, Department of the Interior, Ottawa 1903.

‡ During the early summer of 1904, there was much anxiety in the district on account of deficiency of rain.

DOMINION OF CANADA

TO ACCOMPANY "REPORT ON NORTH-WEST CANADA," BY PROFESSOR MAVOR.

The Edinburgh Geographical Institute

John Bartholomew & Co.

The belief is prevalent in the semi-arid region that mere cultivation diminishes aridity. There are, however, no precise data on the subject and presumptive evidence does not support the belief.

(iv.)—The Soil of the Semi-Arid Area.

Over by far the greater part of the semi-arid region the soil is rich. It lacks only moisture. In some parts the drying up of small lakes has resulted in alkaline deposits; but there can be no doubt about the quality of the soil as a rule.

The following are the records of two sections taken from pits sunk in connection with the new irrigation works of the Canadian Pacific Railway Company on the Bow River near Calgary.* These records give a very fair indication of the character of the prairie sub-soil.

No. 1. Ft.	Surface.
1	Soil, humus.
2–3	Loose clayey sub-soil of a grey or chalky appearance.
4–6	Moderately firm silty soil of a granular nature, breaking up into fine pieces.
7–9	Rather stiff material; has the appearance of fine silt.
10–13	Ditto, but harder.
14–18	Ditto, still harder.
19–20	Compressed sand and clay.
21–25	Somewhat softer, more inclined to be of a silty or clayey nature; found slight soakage of water in a parting at 25 feet.
26–32	Clay, with some sand, with slight admixture of gravel and occasional large stones, and water.
33	Stopped by water.

No. 2. Ft.	Surface.
1	Soil, humus.
2–7	Friable clay with slight admixture of sand.
8–23	Stiff material, largely clay, some sand intermixed.
24	Fine silt or mud.
25–26	Fine silt or mud. Softer and stratified.
27–32	Sand and water, same as from 26 to 33 in No. 1.
33–34	Hard compressed clay.
35–36	Loose, sharp, and with more water.
37–41	Hard compressed clay.
42–56	Hard blue clay, somewhat softer than the above, and getting somewhat softer as it goes down, but all of a strong adhesive nature.

* The writer is indebted to Mr. Pearce, of the Irrigation Department of the Canadian Pacific Railway, for having these particulars worked out from the material recovered from the pits.

III.—The Settlement of the North West.

(i.) General Account with Details of certain Groups.

The settlement of the North West began in a serious sense only after the Government of Canada had purchased from the Hudson's Bay Company their political and territorial rights in Ruperts Land. The survey of the country thereupon began, and the Indian and half-breed population (chiefly French and Scots métis) were compensated for certain rights of theirs.*

Immigration 1872–1886.

About 1872 farmers from the eastern provinces of Canada, especially from Ontario, went into the country in considerable numbers, settling in the Red River Valley and in Southern Manitoba generally.

Mennonites.—In 1874 a large tract of land was reserved (about 500,000 acres) and occupied by a body of about 6,700 Mennonites, who came from the Government of Ekaterinoslav in Southern Russia.† The Mennonites are people originally of Dutch extraction who emigrated to Germany early in the seventeenth century, and who later in the same century emigrated to Russia.‡ Early in the nineteenth century a considerable group emigrated to the United States, where they settled in Pennsylvania, some of them subsequently moving further westward. About 1830, other groups, partly from Russia, and partly from North Germany, where some had founded Altona, migrated to Ontario, where a considerable colony settled in the county of Waterloo. The Quietist views of the Mennonites caused them to be opposed to military service, and this opposition brought them into conflict with the Russian military authorities. Aided by their co-religionists in Pennsylvania and in Ontario, a large body from Ekaterinoslav succeeded in obtaining from the Canadian Government a guarantee of immunity from military service as well as a large grant of land on homestead terms, and in establishing themselves in Southern Manitoba. They have long outgrown their original reserve, and numerous hives of Mennonites have established themselves in recent years in various parts of the North-West Territories.§ The original reserve is arranged on the village system, the houses of the farmers being clustered together, and the polity traditional among the Mennonites has been approximately preserved. The original reserve still possesses a Kaizer, who is to a large extent the warden of their material interests, and a Bishop, who is their spiritual head. Their language, which they retain, and which they teach in separate schools, is German; but it is spoken in a dialect in which there is much admixture of Dutch and Ruthenish or Little Russian.

The loans which the Mennonites effected with the Government of Canada in 1874, guaranteed by mortgages on the property of their co-religionists in Ontario, have long been repaid, and the community has all along been extremely prosperous. Their prosperity has, however, been due to extreme frugality coupled with industry, rather than to productive enterprise. Although they occupy one of the most fertile parts of the Red River Valley, they have no reputation as skilful farmers, and for some years their stock suffered much from in-breeding.‖ They form however an extremely stable

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* Difficulties arose in connection with the settlement of the half-breed claims which led to two rebellions, that of 1877 and that of 1885. The total numbers of Indians (on reserves) and of métis in the North-West Territories and Manitoba, according to the statistics of the Indian Department, are given below, p. 82.

† An interesting account of the settlements of the Mennonites is to be found in the evidence of the late Mr. J. Y. Schantz. Report of Committee on Immigration, &c., Ottawa, 1877, p. 103.

‡ See van der Smissen, C.H.A., Kurzgefatzte Geschichte und Glaubenslehre der Altevangelischen Taufgesinnen oder Mennoniten. St. Clair, Ill. (U.S.A.), 1896; also Sessional Papers, Vol. XXVI., No. 8, Ottawa, 1893, p. xxxi.

§ At the Census of 1901, the Mennonites numbered: Manitoba, 15,246; North-West Territories, 4,273; Dominion of Canada, 31,797. Fourth Census, 1901, Vol. I., p. 145.

‖ When the writer visited the settlement in 1896, this was undoubtedly the case. It is reported that a considerable improvement has been effected in recent years.

and reliable portion of the community, and their offshoots have been characterised by more energy and enterprise than the parent stock. While the Mennonites of Ontario are now to a large extent indistinguishable in any way from the rest of the community, the Mennonites of Manitoba have so far remained definitively apart. They keep aloof from provincial politics, and take no part in public affairs.

Canadian and Scottish Settlers.—During the years between 1876 and 1886, the immigration to the North West consisted largely of Ontario farmers who had disposed of their holdings in that province, and who took advantage of cheap or homestead land to effect a settlement in the new country. Scottish farmers also emigrated to Manitoba to some extent in these years. The effective backbone of Manitoba is composed of these two classes. They applied relatively skilled, although at first rudimentary, methods of agriculture to a soil of extraordinary fertility and established themselves very rapidly.*

Icelanders.—In 1876, groups of Icelanders, driven from their island by the pressure of over-population, began to emigrate to Manitoba. These were, in the first instance, from a mistaken idea as to their customary occupation, sent to the west shore of Lake Winnipeg, where they were expected to make a living partly by farming and partly by fishing. They founded two settlements, one at Gimli, and the other at Icelandic River. For some years the Icelanders at these settlements encountered considerable hardships; they succeeded, however, in surmounting their early difficulties, and form now a fairly successful community. Later arrivals went to Glenborough in Southern Manitoba, where they have succeeded well as farmers. Unlike the Mennonites, the Icelanders have thrown themselves from the beginning into the life of the country. They retain their language, in which they have two newspapers published in Winnipeg; but they also invariably speak English; they elect a member to the provincial legislature, and otherwise take an active and intelligent share in public life.†

Mormons.—In 1887, a small community of Mormons was led by Mrs. Card, a daughter of the Mormon leader Brigham Young, from Utah to Southern Alberta.‡ Undaunted by the aridity of the region selected by them, they set themselves to apply their knowledge of irrigation which they had gained in the arid plains of their own state, and they established themselves at a point, called by them Cardston, immediately to the north of the International Boundary. They brought a considerable amount of capital with them, and have developed a system of irrigation sufficient for their needs.§

English and Scottish Ranchers and Settlers.—Meanwhile, a small ranching population, chiefly English and Scottish, had been growing up in the far west,‖ and a few settlers of the same origin had gone into the Prince Albert and Edmonton districts, old Hudson Bay centres.

Americans.—A small number of farmers came over in prairie schooners (covered wagons) from the Western States, and drifted up into the Red Deer and Edmonton regions, only in many cases to drift back again.

Immigration 1887-1894.

The completion to the coast of the Canadian Pacific Railway in 1886 gave a great stimulus to migration and immigration. Agents of the railway company and of the Government were alike active in inducing settlement. The conditions of life were, however, undeniably hard. The system of homesteading¶ and the system of granting alternate sections to the railway companies,** in spite of many administrative advantages,

* *See* p. 35.

† Since the Icelanders are not distinguished from other Scandinavians in the Census Returns, it is not possible to say what their numbers are at present. There are probably about 10,000.

‡ Their numbers at the census of 1901 were 3,212. Fourth Census, 1901, Vol. I., p. 145.

§ Another and numerically more important Mormon community has since been established, also in Southern Alberta, *see* p. 18.

‖ *See* p. 48.

¶ *See* p. 23.

** On alternate section grants, *see also* p. 21.

had the drawback that the settler with his great farm about him found himself in the midst of an unoccupied area, and sometimes at an immense distance from any of his fellows. This condition of isolation made life on the farm for the average man and for almost all young persons extremely irksome. During recent years the filling up of the country has greatly ameliorated the lot of the settler from this point of view. It is no longer necessary to go into a region where isolation is such as to be a burden.

While, during the years from 1887 until 1894, the Canadian Pacific Railway and other lines which carried branches from it into the farming districts did much to induce immigration, it was still the case that Canada had in the Western States of the United States a serious competitor in the immigration business. Farms were still to be had in the Western States on homestead terms or at comparatively low prices, and the farm labourer who emigrated without capital was certain of employment until he could save money enough to purchase a farm. The practice of renting farms also had crept into the Dakotas, Nebraska, and Iowa, and altogether the inducements to go to the United States were strong for men of little or no capital. The climate of the region to the south had attractions, and the presence in these States and in Northern Michigan, Minnesota, and Wisconsin of German and Scandinavian populations drew immigrants from Germany, Norway, Sweden, Denmark, and Finland in great numbers. The necessary means were borrowed by relatives from local bankers in the States to bring out others, and the agents of the steamship and railway companies were very active.

Nevertheless, between 1887 and 1894 a fairly considerable stream of emigrants of British and of foreign origin found its way into the west. There was no great "boom," but the stream was steady. Farming districts sprang up in different parts of the country, and small towns began to be established. Wherever land was taken up and cultivated, a town grew up at the nearest railway point. To put people on the land was the surest way of bringing about also an urban population, on a small scale at least, at no great distance.*

The foreign immigrants had for the most part settled in the Far West, on the Calgary and Edmonton line. Among the more considerable groups were Scandinavians who settled at Wetaskawin, Battle River, and Red Deer Lake; Germans and Austrians at Stony Plain, west of Edmonton, and east of Leduc; Russians and Austrians on the Saskatchewan River towards Egg Lake and Beaver Lake, east of Edmonton; Moravians from Volhynia in the same district, and Icelanders, west of Innisfail and Red Deer. Some French and German settlers had gone into the grazing country round Leduc; and English settlers had gone to Innisfail, Red Deer, Edmonton, and Lacombe. Some of these settlers began to cultivate grain, not because the country was specially suited for grain cultivation, but because they had no money to buy stock.

In Southern Alberta, a population of varied origin was also beginning to grow in Lethbridge, where the people worked in the coal-mines—Belgians, Italians, Norwegians, Swedes, Icelanders, French, Austrians, Germans, Dutch, Danes, Hungarians, Slovaks, half-breed Indians, Chinamen, Negroes, English, Irish, Welsh, and Scotch. There was a Czech family; and at no great distance, a Basque. All these races comprised, in Lethbridge, a population of about 1800.†

Immigration, 1894-1904.

In 1895 the first signs of an important foreign immigration made their appearance. Prior to that date a few French (from France) had settled on

* The more than concurrent growth of the urban in relation to the growth of the rural population is shown by the fact that in Manitoba the percentage of urban and rural population at the census of 1891 was 26·89 and 73·11, respectively, and at the census of 1901, 27·55 and 72·45, respectively. In the North-West Territories the urban was not distinguished from the rural population in the census return of 1891. In 1901 the percentage was 24·02 of urban and 75·98 of rural population.

† These details are extracted from the writer's notes made in the district in 1896.

the Edmonton line, a few Danes in the same region, and a few Hungarians at Esterhaz in the Qu'Appelle Valley; but apart from these and from the Mennonites in Manitoba there were no important groups of foreign settlers in the North West.

Galician Immigration.—In 1894 the first instalment of what has come to be a very large immigration from Galicia and Bukowina took place. Impoverished by the pressure of over-population with a consequent rise of rent, and by the occurrence of bad seasons, the Galician peasant between the Carpathians and the Russian border readily listened to the offers of the emigration agent, and by means of cheap through rates from Cracow and Lemberg *viâ* Hamburg and Liverpool to a destination in the West, succeeded in transporting himself and his family. Year after year 5,000 to 6,000 Galicians and Bukowinians have reached the West since 1895, so that now there is a Galician and Bukowinian population of probably not less than 40,000. These peasants have settled in large groups at Beaver Lake near Edmonton, at Rosthern on the Prince Albert line, and at Dauphin between the Duck Mountains and Lake Winnipegosis. From 1895 till 1899 the Department of the Interior encouraged this immigration by giving a substantial bonus to the steamship companies and to agents. In the summer of 1899, the bonus was cancelled, but the stream once started went on of its own momentum, and Galicians are still coming in considerable numbers.

The peasants speak Ruthenish or Little Russian, and belong to the Uniate section of the Greek Orthodox Church. Large bodies of the Galicians have established themselves in the Dauphin district at Rosthern, and elsewhere; but the principal settlement which is now subject to constant increase is in the Beaver Lake district, near Edmonton. This is the ecclesiastical and social centre of Galician life in the North West.

The Galician peasant has undoubtedly proved himself to be an important agent in extending the area of cultivation. He cannot be said to be a high class farmer; but he is very industrious. He is generally frugal, although sobriety is not a conspicuous characteristic. Arriving without means as a rule, he takes employment in railway construction or in farm labour, and within a few months he has generally accumulated enough to establish himself on his homestead. Within four or five years he is in a comfortable position, with a good house and farm buildings, and enough agricultural implements and stock for his needs. It is not a rare case to find him buying, on instalment terms of course, 320 acres or more of railway land adjoining his farm. When he begins, it is often necessary for the Government to lend him seed for his first crop. These seed loans are secured upon his land, and are generally paid with much promptitude. While the Galician peasant does not lead quite so self-contained a life as the Doukhobor, and does not, like the latter, live in a village, he is, nevertheless, not a very extensive purchaser, nor can he be said to be at present an important factor in wheat production. This is partly due to the circumstance that the Galicians are not settled in any considerable numbers in any important wheat-producing district.

The Doukhobortsi or Doukhobors.—The group of foreign immigrants which has attracted more attention in Canada than any other is the Russian peasant sect known as the Doukhobors or Doukhobortsi. Their proper designation is "Christians of the Universal Brotherhood," but they have come to be known by, and have adopted the shorter name, which means "Wrestlers with the Spirit" or "Spirit-wrestlers." This peasant sect numbered in 1898 about 20,000 persons, in two groups, separated by a schism which occurred about 1886. Their peculiar religious beliefs, derived from ancient Eastern heresies and from German mysticism of the seventeenth and eighteenth centuries, need not be discussed. It is sufficient to point out that these led to ascetic practices, varying in intensity, to a disposition in general towards community of goods, and to objection to render military service. The latter characteristic came out strongly in one of the parties after the schism, and brought the greater of the two parties (about 12,000) into conflict with the Russian military authorities. After a series of "persecutions," they petitioned for

permission to leave the country. Their representatives approached the Canadian Government in July 1898, and in January 1899 the first shipload arrived at St. John's, New Brunswick, with about 1,200 immigrants direct from Batoum. Successive vessels arrived within the following three months. Altogether 7,200 persons belonging to the sect arrived between January and April 1899.

The groups came from three districts, from Kars, Elizavetpol, and Tiflis. Although the peasants were by no means destitute (they even brought with them a considerable sum of money in the aggregate, and a very large quantity of effects), the migration of so large a number was only effected by means of assistance, partly from friends of the sect in Russia, and partly from members of the Society of Friends in England and in the United States.

An area of land in three districts in the North-West Territories was reserved for homestead entry on the part of the Doukhobors by the Government. The localities are indicated on the map showing the distribution of immigrants. The total reserved area amounted to about 320,000 acres. Since 1899 additional lands have been purchased by the Doukhobors, so that at present their reserves approach 350,000 acres in all. Their settlement was effected with much industry in 1899, 1900, and 1901, and they seemed to be in a fair way to become a highly prosperous community, when in October 1902 an outbreak of religious fanaticism, combined with vague dissatisfaction with the severity of the winters, and probably with acute nostalgia, resulted in a "pilgrimage," accompanied by the liberation of their domestic animals and the abandonment of their villages. This outbreak affected about one-fourth of the community. Although the people eventually returned to their homes, the "pilgrimage" entailed a considerable loss to the community, and retarded its material progress. Sporadic outbreaks have occurred on two occasions since 1902, but they did not have any serious influence. In the autumn of 1902 there arrived at the community the hereditary leader of the sect, Mr. Peter Veregin, who had been allowed after 15 years of exile to leave Siberia and to go to Canada. He at once took measures to repress the outbreaks of fanaticism, and to restore in the community the village community system, which had been to a considerable extent invaded by individualism. The result is the establishment of a very remarkable and very complete system of communism. It is doubtful whether at any time there has been in any place quite so complete a system of community of goods on so large a scale as he has succeeded in establishing. He found, of course, a community predisposed to such a polity*; but the influence of his authority has been so great that he has practically compelled most of those who had become individualists to return to the community system, and to submit to its development to the completest extent.

Rather more than three-fourths of the Doukhobor settlement are adherents of the community system—or about 7,000 persons, the population now being between 8,000 and 8,500. Though nominally and legally held in severalty, under the homestead system, in which each male adult is entered for 160 acres, the land is not explicitly parcelled out in terms of homesteads. The community lives in villages, each containing the arbitrary number of forty families, approximately 200 persons.

The land is cultivated in common, the men of each village cultivating the land in its neighbourhood. Literally, everything is held in common. All produce, as well as everything that is purchased by the community, is at the disposal of anyone who wants it. No man need feel any anxiety about the maintenance of his family. Every summer large bodies of Doukhobors are employed on railway construction, sometimes at a great distance from their settlements, under contract or sub-contract made between the railway contractor and the leader, Mr. Veregin. The earnings of these men are put into the common purse, less their necessary expenses while they are away from their villages. The working force of the community available for

* Although their views and practice as regards communism have alike been subject to great oscillation.

external labour of this kind is from 500 to 1,000 men according to the season. The net earnings of these more than suffice to pay for what commodities the community must import. These commodities are purchased in quantity and stored in the warehouses of the community at Yorkton 35 miles from the nearest settlement. In addition, the community purchases each year, agricultural machinery, horses and cattle.

There is at present a comparatively small surplus of grain for export from the community, but they collect and send out large quantities of seneca root (last year to the value of about 1,400*l.*), and they have other minor exports.* Otherwise, they are absolutely self-contained. They grind the wheat grown by themselves in their own mills; they grind their flax also in their own mills, and press linseed oil. They grow flax for yarn and spin and weave it into linen. They spin and weave wool into woollen cloth, and, as a rule, they make their own garments; although, when they are working externally, the men buy ready-made clothes. Their threshing machinery, flour and flax mills, and their saw mills are all driven by steam power.

The total external income of the community last year (1903) was about 50,000*l.*, and with this amount they purchased additional land and agricultural machinery, &c. Each village has a large stable for horses, another for cattle, and a large shed for agricultural implements. At present the houses are built of logs, but the discovery of a good brick-making clay on the reserve has induced them to instal brickmaking machinery in order to have brick houses. One steam plough was set to work in the autumn of 1904 upon a portion of the reserve. If the experiment turns out successfully, others will be obtained.

It is proposed to erect an elevator in anticipation of extensive wheat production, and also to connect the villages by telephone, and, perhaps, by a narrow-gauge railway. The distances between the villages are great, and the people at present undergo great difficulties in visiting each other. The reserve is really worked by Mr. Veregin on the principles of estate management on a large scale; he compels the community to save, and he manipulates the capital so saved, as it were, in one mass.

It remains to be seen what are the economic advantages, if there be any net economic advantages, to the community and to the country of this unique communistic group. It remains to be seen also how a number of peasants not conspicuous for their amiability, will permit themselves to be managed, even for their own good, by a leader so authoritarian, albeit so able, as Mr. Veregin.†

Nestorians.—On the edge of the high prairie above the broad Saskatchewan Valley, opposite Battleford, there stands a long, low isolated house built solidly of stone—unhewn rubble—with a flat roof, exactly such a house as one may see in the near East. This house has been built by a small group of Nestorians, who came from Persia to Canada in 1903, viâ the United States, where they remained for a short time. They had lived near the Russian border in the arid region through which the military road passes into Persia.

Immigration from the United States.—The recent considerable immigration into the Canadian North West from the United States is attributed by some to the activity of the immigration agents. This, however, cannot be regarded as accounting for the stream; although it may to a certain extent account for

* It is clear that when external earnings diminish, as after the construction of the railways they must, the exports will have to be increased, or their external purchases diminished.

† The only account of the Doukhobortsi which gives authentic details of their history and early polity is to be found in Haxthausen, Etudes sur la situation intérieure, la vie nationale et les institutions rurales de la Russie. Hanover, 1847, Vol. I., pp. 355–388. There is no critical account of their recent history, although many pamphlets and some books have been written about them.

the direction of it. The immigration has come principally from the Western States, and chiefly from the Dakotas, Nebraska, Iowa, and Utah. As regards the last of these, Utah, the main cause seems to have been the increase of population on a soil rendered fertile only by artificial means, and the consequent rapid rise in the value of land. The immediate cause was the enlistment by the Canadian North West Irrigation Company of leading Mormons in an extensive scheme for the irrigation of a large part of southern Alberta. The presence of an older and prosperous Mormon community in the district, and the experience of the Mormon farmers in the arid area in which their own State is situated, facilitated the arrangements which resulted in the immigration.*

The immigration from the other States has resulted from somewhat analogous causes. The pressure of population has raised the value of land and has thus rendered it more difficult for the settler with slender capital to acquire an independence, while the immigration of farmers with capital from the Eastern States has made it possible for the western farmers to dispose of their holdings to advantage. The farm labourer in search of "homestead" land was obliged to come to Canada for it, and the farmer who had sold his "improved" land to advantage was able to come with sufficient capital to begin life again with benefit to himself and his family.

The practice of renting farms, which had become common in the Dakotas and in Nebraska and Iowa, had resulted in the rise of rents and in consequent dissatisfaction on the part of the "renters." The "renters" had in general acquired some capital, and to them also emigration offered at once relief from a condition of partial dependence and a prospect of gain. No doubt the activity of colonization companies, of land companies formed to exploit the railway land grants, of the railway companies and of the Government immigration agents, is to be credited with the direction the stream has taken; but the conditions in the United States have been more favourable for the successful exercise of this activity during the past few years than ever before.

The immigrants from the United States who have come under these conditions are to some extent repatriated Canadians, to a very large extent immigrants of foreign origin† who had spent a few years in the United States, and probably to a considerably less extent Americans of the second or third generation.

British Immigrants.—During the past three years a considerable number of British immigrants have come to the North West. They have not been drawn so exclusively from the farming class as the immigrants from other countries. The comparatively small agricultural population in the United Kingdom is sufficient to account for this. The section below on the distribution of recent immigrants and the map will show that with one or two exceptions they have not established themselves in groups. They have distributed themselves over the country, or have gone into the towns. The most conspicuous case of group settlement is the "all British" colony of *Britannia* which lies half way between Edmonton and Prince Albert, about 20 miles south of the North Saskatchewan river.

This immigration scheme was promoted in the spring of 1903 by the Rev. Mr. Barr and the Rev. Mr. Lloyd. The immigrants, largely drawn from the English cities, and consisting to a very large extent of commercial travellers, bank clerks, and artisans, were placed upon land,‡ selected by Mr. Barr, 200 miles from a railway station. This immense distance had to be traversed by trails at a time when the spring thaws had made them

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* The Mormon settlement is described on p. 53.
† Very largely Germans, *see* p. 26.
‡ South of Fort Pitt, on the North Saskatchewan.

almost impassable. A great amount of unnecessary gallantry was exhibited in overcoming wholly unnecessary difficulties. Equally suitable land could easily have been obtained within much easier reach of the existing railways. Colonies of this kind, occupied by people unaccustomed even to rural life in a settled country, can only be successful, if at all, after great suffering to the colonists and great expense to the administration.

It is to be hoped that if any more "all British colonies" are organised, regard will be had to the conditions under which life in the remoter parts of Canada must be conducted; and that the British immigrant will be placed where he can have at least some of the comforts of organised life, with which, however slender his resources may be, he finds difficulty in dispensing.

The colony numbered originally about 1,700 persons.*

(ii.) The Distribution of Recent Immigrants.

Examination of the map† showing the distribution of immigrants will make plain the districts into which immigration is principally going. The selection of land for groups of immigrants is generally accomplished by means of "delegates" who, accompanied by land guides provided by the Immigration Department, travel at reduced fares, or, in certain cases, with railway passes, to the station nearest the district they wish to examine, and they are then driven over the land. In remote places it is sometimes necessary to camp out; but, as settlement increases, this becomes less incumbent on the land seeker.

In cases where an extensive colony is projected, a great deal of skill is sometimes brought to bear upon the selection. The criteria of land estimation are very numerous, and it would be hazardous to state even in general terms that the "best" land is taken up first. The "best" land is sometimes available, and sometimes not available for the intending homesteader. It may consist of school lands which are held on behalf of the education funds at a fixed price, or it may be Hudson's Bay Company or Railway lands similarly held. Moreover, in the embarrassment of choice among numerous districts, each with its advocates, it is not easy to decide which is the best land, taking all criteria into account.

The land seeker is apt to be paralyzed with advice, and is still more apt to go wrong if he is left to his unaided wisdom. The conditions of a new country are very interesting and very difficult to master. Experience of European farming is not always to be trusted, for it is not always applied with intelligence, and account is not always taken of essential differences in atmosphere and soil, as well as of the important economic differences which a vastly greater extent of area involves. Even the details of life require adjustment.

A farmer who deliberately selects a homestead 50 or 100 miles from a railway station, must make up his mind that the comforts of the coal fire to which he was accustomed in Yorkshire cannot be had on the prairie, and that he cannot send to a shop for everything he wants, as he wants it, because the shop is a couple of days journey from his house. These are actual and frequent cases. Isolation has its charms and its compensations; but it also has its immense disadvantages. The fact is, that there is no need for anyone to take up land at a great distance from the sources of supply.

Many English settlers, either through their own want of judgment, or through the bad advice of those on whom they relied, have settled in regions quite unnecessarily remote, and have then grumbled at their isolation. The pressure of population will one day drive land seekers beyond the confines of existing settlement; but there is no need for such excursions at present. The writer drove for days through unoccupied land open for settlement by

* When the writer visited the colony in the summer of 1904, he found that many had left it to settle in other parts of the country, and that very few of those who remained had been able to make much progress in establishing themselves, owing to ignorance of the rudiments of agriculture and to their want of experience of rural conditions.

† *See* Map IV. at end of volume.

homestead entry, and of the finest quality, to the homesteads of settlers beyond the confines of civilization, and on land that was no better, if it was as good, as the lands through which these settlers had toiled to reach their destinations.

An immense amount of harm is done to the reputation of Canada by immigrants who go straight from the cities in England, where they are surrounded by the conveniences of highly organised society and highly developed trade, to the isolation of the most northerly prairies, where there is no organised life, and where everyone finds himself absolutely face to face with the facts of raw nature. The discipline is a valuable one if the victim survives, but a more gradual approach is advisable. The fresh arrival frequently undertakes adventures in his ignorance from which the experienced pioneer recoils. The result is much unnecessary suffering, and some loss of life.

The selection of land is a very important affair in colonisation. In a country like Canada, where immense areas are open to settlement, only the most experienced pioneers, or the most hardy peasants, ought to attempt pioneering on the margin. There are many districts in which life is organised, at all events up to a certain plane, where settlers may go, and yet have all the isolation they could desire.

While it is not expedient that the emigration of the "unfit" to Canada should in any way be encouraged, the population in the West is large enough already to absorb a certain number of the relatively unfit, and perhaps to improve them; but the concentration in large out-of-the-way camps of groups of such persons must end in disaster for the people themselves, and can under no circumstances add to the productive powers of the country. It is to be hoped also that the element of land speculation, for example, will be steadily discouraged. The homestead system is intended for the cultivator, and not for the speculator.

The experiences of the Barr Colony, and of some others, has led to a certain repugnance to the settlement of colonists in groups. This is a large question, which need not be discussed fully here.* The relative advantage of settlement in nuclear groups, and of settlement by distribution, are not easy to assess. In the first, there are the advantages of social life, and sometimes of community of race or consanguinity, or of uniformity of religious belief; in the second there is the advantage, if it results, of general social or national solidarity, as opposed to the solidarity of the group.

Historical conditions have given Canada an example on a large scale of the first case—in the French Canadian population on the St. Lawrence, and legislative conditions have given in the North West an example of the second. The provision that in all railway land grants there should be reserved for the Government every alternate section (640 acres = 1 square mile), rendered it impossible for settlement within the area of these land grants to be otherwise than distributed. The Mennonite settlement in Southern Manitoba was effected before the large land grants were made.† These grants were made shortly after, and for many years no nuclear colonies were established. Nevertheless, people belonging to the same race, *e.g.*, in one case a group of Hungarians, and in another, one of Finlanders, settled in the Qu'Appelle district on homestead lands, with the alternate sections of railway lands intervening. As they prospered they sometimes purchased the adjoining lands, although also sometimes other settlers came in between them. In 1899, as described, the Doukhobor Colony was established, and in that case, in order to secure for the Colony land in a solid block, railway lands were

* This question, with others in connection with Immigration and Colonisation, is discussed in the Report on Immigration made to the Canadian Government by the writer. Report of Department of Interior, Ottawa, 1899, p. 204.

† *See* p. 12.

exchanged for others. The Colony was thus endowed with three separate areas, each of these areas being compact.*

It cannot be denied that when one is dealing with land on the confines of settlement, or beyond the confines of previous settlement, there are great advantages in the nuclear, compact colony. The people help each other, and the progress of the group is probably greater than it would be under other conditions.† So far, however, as the less remote parts of the country are concerned, the "shell" of settlement having been formed by the alternate section system, the group colony cannot now be established, even if it were advisable to do so. From the point of view of the advisability of speedy assimilation, a matter to which some attach considerable importance, it would appear that the group colony system is less favourable to assimilation than the system of isolated settlement. On the other hand, the group colony system probably yields, at least on the margin of settlement, more immediately favourable results in material comfort and in amenity of personal life. The particular form of economic polity—communism or individualism—involves other considerations, although, speaking generally, there can be no doubt that the group colony affords a favourable field for the growth of a communist society, while the distributed system of settlement affords a favourable field for the growth of an individualist society. The historical antecedents of the people concerned have to be taken into account in each case.

The method of group settlement considered above has as a usual feature the reservation by the Government of a specified area large enough to permit of the expansion of the colony. There are, however, cases of more or less compact colonies which have grown without any specific reservation; although in some cases there has been an undeclared policy, liable to change at any moment, which resulted in the settlement of people of a certain race in a certain area or areas. This may be said to have been the case with the Galician immigration.

(iii.) The Growth of Towns.‡

While the growth of towns is the inevitable concomitant of agricultural development in a commercial sense, it is by no means necessarily to be regarded as an infallible index of the development of an agricultural community.

It may well be held that unless the town give back in intellectual, moral, and social stimulus the equivalent of its economic cost to the rural community, either the rural community or the town will go bankrupt. But this stimulus counts for a good deal, even with peasants who, for want of it, have suffered much depression of life in Eastern Europe. Although exact statistics are wanting, there seems to be no doubt of the greatly enhanced vitality of the European immigrant, a vitality not referable purely to better air and better food, or even to the infusion of the spirit of hopefulness, but possibly also to the great access of stimulating impressions to which in some considerable measure the small town contributes.

Yet the very rapid growth of the small town in the centre of an agricultural community is not to be looked upon without misgivings. One may see the disadvantages of it most conspicuously in the earlier stages, when trivial speculation in small lots of land occupies the minds and distracts the energies of the people. Similar speculation in the large towns leads to similar results on a larger scale, and to the concentration in the towns of an unproductive class.

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* Recent purchases have been made by the Doukhobors of adjoining lands.

† The outbreaks of religious fanaticism among the Doukhobors need not be confused with the results of the group system. They might have occurred in any case. *See* p. 16.

‡ For the municipal systems of the North West, *see* Ewart, Alan C., "Municipal History of Manitoba," and Wickett, S. Morley, "Municipal Government in the North-West Territories" (University of Toronto Studies in History and Economics, Vol. II., No. 3, 1904); also the Municipal Act, chap. 116, Revised Statutes of Manitoba, 1902, including the Amendment of 1903 and 1904, published by authority, Winnipeg, 1904.

Winnipeg‖ (*Province of Manitoba*).—Winnipeg is the Chicago of the Canadian North West. In thirty years it has grown from a small country town into an important city, well built, well paved and possessing electric street railways, electric light and an extensive waterworks system. It is the commercial, manufacturing and financial centre of the whole North West. As a railway centre it occupies a peculiar position, for through the narrow pass in which it is situated all the eastward and westward traffic of the North West must go. There are large flour mills in Winnipeg, and near the city there are extensive undeveloped water powers. The area of Winnipeg, immense in proportion to its population (12,750 acres* to 42,340 persons, census of 1901), involves a relatively great cost for paving, sewerage and general administration.† From 1874 until 1881 Winnipeg grew slowly; in 1882 the population more than doubled, under the influence of the opening of the Canadian Pacific Railway, and during the two succeeding years there was a furore of speculation in urban lands. In 1884 the "boom" collapsed, and for many years thereafter Winnipeg felt the effects of previously inflated finance. Between 1885 and 1895 there was a slow natural growth supplemented by immigration, the population being nearly doubled in the decade. Since 1899 the population has increased rapidly, and a new furore of speculation has been going on, especially during 1903 and 1904. The prices of urban land have advanced sharply, and the establishment of important wholesale houses, together with the building of new bank premises and hotels, has contributed an element of apparent stability to their advance.

Edmonton (*Alberta*).—The town of Edmonton,‡ the present terminus of the Calgary and Edmonton Railway,§ is the trading centre of a large district into which settlement has been going with great rapidity. It is

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* The City of Glasgow, including its incorporated Burghs and districts, with a population of nearly a million, covers only 11,861 acres. (Vital Statistics, &c., Nicol, J., Glasgow, 1891, p. 10.)

† In 1903, the total amount of the tax roll, including the school rate, was $876,126, the total rates being 2·15 per cent. on the assessable property. (Comptroller's Report, 1903, p. 264.)

‡ Incorporated in 1892. The population is given in the Census Returns (1901) as 2,626 (Census Report, Vol. I., p. 130); and in the local police census (1903) as 5,445 (Town of Edmonton, Auditor's Report, 1903, p. 34).

§ Strathcona, on the opposite bank of the Saskatchewan river, is the actual terminus; but a short line belonging to the Canadian Northern Railway connects the two towns.

‖ The following table, compiled from the Statistics published by the City Council of Winnipeg, and from the Auditor's and Engineer's Reports, supplemented by information from these officers, shows the growth of the city:—

Year.	Population.	Total Assessable Property.*a*	Paved Streets.	Boulevards.	Sewers.	City Debentures outstanding.*c*	Bank Clearings.
	Number.	Thousand $.	Miles.	Miles.	Miles.	Thousand $.	Thousand $.
1871	241	—	—	—	—	—	—
1874	1,869	2,676	—	—	—	249	—
1880	6,178	4,008	—	—	—	449	—
1881	6,245	9,156	—	—	3·66	649	—
1882	15,000	30,303*b*	—	—	5·50	1,886	—
1883	20,000	32,883*b*	1·75	—	6·34	1,826	—
1884	16,694	27,444*b*	3·25	—	18·	2,498	—
1885	19,574	19,711	4·25	—	18·75	2,498	—
1895	37,124	22,168	11·84	—	38·7	2,464	56,873
1896	37,983	22,560	12·44	1·08	39·4	2,473	64,146
1899	40,112	23,519	33·11	14·67	47·9	3,372	107,786
1900	42,534	25,077	39·53	27·8	51·8	3,277	106,956
1901	44,778	26,405	47·01	37·8	58·5	3,633	134,199
1902	48,411	28,615	53·50	44·6	64·	3,802	188,370
1903	56,603	36,273	58·5	50·0	72·40	4,045	246,108
1904	67,265	48,214	66	61·6	84·00	4,691	294,601

a Real and personal property. Proportion of real property about 80 per cent.

b 1882, 1883 and 1884 were years of inflation.

c Exclusive of Local Improvement Debentures, for which property owners are liable. In 1903, these amounted to $1,637,756 (Comptroller's Report).

also an important post for the collection of furs by the Hudson's Bay Company and by other fur traders. It possesses municipal waterworks, sewerage, and an electric light system. A pork packing factory and a brewery have recently been established. The amounts of the net assessment of property annually reported by the auditor show considerable fluctuations.* These fluctuations have been caused by periodical speculation in urban lands due to anticipations of very rapid growth which have not always been realized.

Calgary (Alberta).—Calgary has the great advantage of a readily available supply of building stone which has given it excellent buildings. It is the financial and social centre of the ranching region to the south and of at least a portion of the farming region to the north. The development of the mines in the Kootenays in British Columbia and of those in the Yukon has made it the centre for the supply of beef and horses. It was in and near Calgary that the first important experiments in irrigation in the semi-arid region were carried out. The position of Calgary at the base of the foothills of the Rocky Mountains renders it inevitable that it should be an important town, belonging at once to the prairie and to the mountain region.†

The only industries established so far are brewing and pork packing.

(iv.) System of Survey and Homesteading.

The system of survey adopted by the United States, and by Canada for the North West, involves the parcelling-out of the country into square blocks each of 36 square miles. One of these blocks constitutes a township. The survey lines are taken from the so-called principal meridian, Long. W. 97° 30′, which passes near Winnipeg. The townships are numbered from south to north, and each series of townships is known as a range. These ranges are numbered eastwards from the principal meridian and westwards from it and from each of the other meridians up to the fifth. It is a sufficient description of a township to describe it for example as Township 50, Range 10, W. of Second Meridian. Each square mile in the township is a section. A section is 640 acres, and each quarter section is 160 acres. This 160 acres is the unit

* The figures are stated in millions of dollars, 000's being omitted.

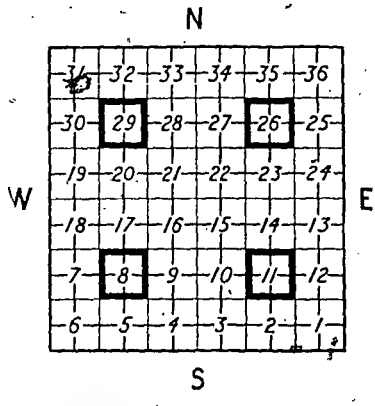
Year.	Net Assessment.	Taxation Rate Per cent.	Year.	Net Assessment.	Taxation Rate Per cent.
	Million $.			Million $.	
1892	·673	1·600	1898	1·030	2·445
1893	·964	1·630	1899	1·188	2·323
1894	·968	1·250	1900	1·244	3·025
1895	1·131	1·930	1901	1·395	2·900
1896	·914	1·963	1902	1·724	2·800
1897	·768	2·285	1903	3·208	2·150

† The following particulars have been supplied by the City Clerk of Calgary:—

1. Amount of assessable property real and personal, 1901, $4,099,437.
2. Tax rate per dollar, 22 mills or 2·2 per cent.
3. Expended for school purposes, $26,000.
4. General debentures (including waterworks, but not including local improvement debentures), $356,500.
5. Rate of interest on debentures, 4 per cent., 4½ per cent. and 3 per cent.
6. Population, 12,000.
7. Area of municipality 3¼ square miles.

(The population according to the Census Returns in 1901 was only 4,865, Census, Vol. I., p. 130.)

for land settlement purposes. That is the amount which any one who makes a homestead entry receives on payment of $10 (2l.) He may if he chooses enter for 80 acres or for 40 acres on payment of a proportionate fee; but this is rarely done. The sections are numbered and described as follows:—*



Each quarter section is designated by the number of the section to which it belongs, together with the point of the compass as determined by its position. It is therefore a sufficient description of a quarter section to refer to it as the N.W. quarter of section 16, Township 40, Range 10, W. of Second Meridian. Such designations are often used by way of addresses for the post, although as yet there is no rural delivery of letters in the North West. Sections 11 and 29 in every surveyed township "are set apart as an endowment for purposes of education."† These are designated school lands. The school lands are administered by the Minister of the Interior. Sections 8 and 26 in each township form the land grant which was given to the Hudson Bay Company in addition to a money payment for deprivation of their territorial jurisdiction.

This system of survey has determined the usual size of farms. A farm is normally 160 acres, 320 acres, 480 acres, or 640 acres. The usual size is 160 acres, or one quarter-section throughout the Territories; in Manitoba the usual size may be regarded as 160 acres. There are, however, larger farms in both regions. In the Indian Head District (N.W.T.), for example, the wheat farms are often 640 acres, 1,280 acres, or even 2½ sections or 1,600 acres. Upon the person who enters for a homestead rests the burden of bringing it into cultivation. It is necessary also for him to become a British subject, unless he is one already, before he obtains the patent for his lands. This patent may, according to the Homestead Act, be taken out within three years after the entry has been made. Pre-emption of entry has now been abolished, but six months, which may be extended to twelve months, are allowed "to perfect the entry," that is, to enter upon possession and to begin cultivation. The following clause provides for village settlement:—

> "If a number of homestead settlers, embracing at least twenty families, with a view to greater convenience in the establishment of schools and churches, and to the attainment of social advantages of like character, ask to be allowed to settle together in a hamlet or village, the Minister [of the Interior] may, in his discretion, vary or dispense with the foregoing requirements as to residence, but not as to the cultivation of each separate quarter section entered as a homestead."‡

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* Determined by 46 Vict. c. 17. s. 4.

† Revised Statutes, chap. 54, amended by frequent subsequent Acts. *See* Abridgement of Dominion Lands Act, prepared for distribution, January 1903. [Ottawa, 1903.]

‡ Revised Statutes of Canada, chap. 54, sec. 37.

TABLE showing the NUMBER of HOMESTEAD ENTRIES reported in each YEAR since 1874, and the NUMBER and PROPORTION of those ENTRIES which have been CANCELLED for NON-FULFILMENT of the conditions of ENTRY.*

Year ended	No. of Entries.	No. Cancelled.	Per-centage.	Year ended	No. of Entries.	No. Cancelled.	Per-centage.
October 31, 1874	1,376	890	64	October 31, 1890	2,955	1,154	39
„ „ 1875	499	307	61	„ „ 1891	3,523	1,465	42
„ „ 1876	347	153	44	„ „ 1892	4,880	2,180	45
„ „ 1877	845	463	54	„ „ 1893	4,067	1,674	41
„ „ 1878	1,788	1,385	77	„ „ 1894	3,209	1,391	43
„ „ 1879	4,068	2,066	50	Dec. „ 1895	2,394	1,041	43
„ „ 1880	2,074	685	33	„ „ 1896	1,857	525	28
„ „ 1881	2,753	645	23	„ „ 1897	2,384	608	26
„ „ 1882	7,483	3,563	48	„ „ 1898	4,848	1,199	25
„ „ 1883	6,063	1,993	33	„ „ 1899	6,689	1,857	27
„ „ 1884	3,753	1,251	33	June 30, 1900	7,426	2,231	30
„ „ 1885	1,858	653	35	„ „ 1901	8,167	2,629	32
„ „ 1886	2,657	915	34	„ „ 1902	14,673	7,007	48
„ „ 1887	2,036	530	26	„ „ 1903	31,383	7,341	23
„ „ 1888	2,655	809	30	„ „ 1904	26,073	2,715	11
„ „ 1889	4,416	2,092	47	Six months ended 31 Dec. 1904.	11,866	1,148	10

The variations in the proportions of homestead entries which are cancelled on account of non-performance of homestead duties may be ascribed to the varying character of the immigrants, some being more inclined to wander than others, to varying stringency in carrying out the law, and to the prevalence or otherwise of speculative entry, or entry made with a view to sale of the land before the expiry of the statutory period for the fulfilment of duties and completion of entry.†

TABLE showing from the CENSUS RETURNS, 1891 and 1901, the NUMBERS of OCCUPIERS of LAND in MANITOBA and the NORTH-WEST TERRITORIES, together with PARTICULARS as to the LAND OCCUPIED or OWNED.

	Manitoba.		North-West Territories.	
	1891.	1901.	1891.	1901.
Number of occupiers	22,571	32,495	9,244	23,098
	Acres.	Acres.	Acres.	Acres.
Land occupied	5,223,272	8,843,347	2,910,144	6,569,064
„ owned	—	8,073,894	—	6,123,465
„ leased or rented	—	769,453	—	445,599
„ improved	1,232,111	3,995,305	196,773	1,597,296
„ unimproved	—	4,848,042	—	4,971,768
Mean area of land occupied per occupier.‡	233	262	315	284

* Information supplied by Mr. James A. Smart, Deputy Minister of Interior. The number of homestead entries made between 1st January and 30th November 1904 was 26,193, and the number cancelled 8,794, or 34 per cent. The entries cancelled in each year have, as a rule, been made in some previous year. In the above table the cancellations are distributed over the years to which the corresponding entries properly belong. For example, of the 8,794 entries cancelled in 1904 (up till 30th November), 1,169 were made and cancelled in 1904; 5,005 were made in 1903 and cancelled in 1904; 2,051 were made in 1902 and cancelled in 1904; the remaining 569 were made in various prior years as far back as 1880.

† There is reported to have been a considerable increase in speculative entries since the so-called "American invasion" began. The figures given in note (*) above for cancelled entries in the present year (1904) seem to confirm this.

‡ Calculated from Census Returns. In 1901 the "land occupied" refers to agricultural land, in 1891 to all occupied lands. Lots under 5 acres included in the above in 1901 are:—

Manitoba.—Occupiers of lots under 5 acres - - - 683
Land occupied under 5 acres - - - 988 acres.
North-West Territories.—Occupiers of lots under 5 acres - - 285
Land occupied under 5 acres - - - 261 acres.

See Bulletin No. XV., Census Returns, 1901.

The foregoing table shows that in Manitoba the acreage of land cultivated by owners is 91·3 per cent. of the whole, and the acreage rented only 8·7 per cent.; and in the North-West Territories the acreage cultivated by owners is 93·2 per cent. and the acreage rented 6·8 per cent.

The amount of capital necessary for the establishment of a colonist varies with the district, with the kind of cultivation he intends to adopt, and with the standard of comfort of the colonist himself. The peasant settler in the north provides himself at the earliest moment with the following indispensable outfit for the beginning of cultivation :—

	$
Yoke of oxen costing	180
Wagon	20
Milch cow	30
Breaking plough	14
	$244

In addition he may expend any sum for the fittings of his house which he may regard as necessary.

With from $250 to $350 (50*l.* to 75*l.*) he can establish himself.* He can obtain from the Government seed for the first year, his homestead patent being held in pledge for the ultimate payment of this seed. He must, of course, build his own house.

In different parts of the country the prices vary, and to some extent the indispensables vary also, for example, where oats are cheap and plentiful, horses may be more economical than oxen.

(v.) Details of certain Districts.

It does not seem necessary to give details of all of the districts into which immigration is now going; several of the districts have been noticed incidentally elsewhere, but two of the newer districts, Rosthern and Regina, which may be taken as types, may be here described in some detail.

Rosthern District (*in Saskatchewan*).—Since 1901 almost all the immigration into this district has been foreign immigration. Between 1896 and 1904, about 3,000 Galician families of about 15,000 souls; about 500 Bukowinians; about 1,500 Hungarians, including 250 Slovàks (speaking Slovàk and Magyar) from the North of Hungary, *viâ* Pennsylvania and Ohio; about 48,000 Germans and Mennonites; about 5,000 German Catholics from the State of Minnesota (U.S.A.); about 5,000 French-Canadians; and some Orthodox and Reforming Jews from Hungary, have gone into or are now in the district. About 1,500 Doukhobors are also settled in 13 villages. These villages are all called by Russian names, and the sign posts at the divergence of trails are inscribed in Russian characters. The names of some of the villages are Terpenie (patience), Troitska, (Trinity), Kalmakova (called after the Doukhobor woman, who was the hereditary leader of the sect until her death in 1886).

A new colony of Mennonites is just now (1904) establishing itself. In the town of Rosthern one-half of the people (about 500) are Germans. There are some Mennonites, or rather Burgthalers, in the town. The Burgthalers are Mennonite secessionists who have broken off from the older organisation rather on social than on theological grounds. The Orthodox Mennonite does not believe in the town; he is a partizan of the village. The Mennonites

* Such an estimate may be taken as valid for the peasant settler from Continental Europe or for settlers accustomed to a like standard of comfort. For others a larger initial expenditure would be necessary. This expenditure may vary from $500 or $600 for the provision of minimum requirements to $1,500 and upwards for more ample and comfortable settlement. The settler must, however, in all cases, make up his mind, at least at first, to do without many conveniences to which he has been accustomed. The estimate of $250 to $350 does not include the cost of a house. The peasant immigrant builds one with sods or with logs cut by himself on or near his own land, and the outside is sometimes daubed with clay.

have been very successful, yet from time to time they are overcome by a spirit of restlessness and make up their minds to sell their improved farms and go elsewhere in the North West. They are represented by competent authorities to be, as a rule, indifferent farmers and to be apt to exhaust the soil by continuous cropping.

In the Rosthern district during the season 1902–3, the farmers loaded on cars and shipped on their own account 50,000 bushels of wheat, while the local elevators bought and shipped 450,000 bushels. Some of those farmers who sell their wheat in Winnipeg do so to the same elevator companies who have local elevators in Rosthern. This practice is not unfavourable to the elevator companies, since they are thus certain to have the wheat delivered, and thus avoid the risk of having to hold it after the lake navigation season has closed.

As a rule, the farmers in the Rosthern district begin to plough immediately after threshing, and hold over their wheat in order to haul it to the railway in the winter. This they begin to do in November. The farmers report that in 1902–3 they considered that their wheat was classed too low at Fort William, and that they lost heavily in consequence. They say that they have made up their minds not to ship on their own account again. When a farmer ships on his own account he cannot know for some time what his wheat is going to yield him. When he sells to the local elevator he knows at once.

The Milling Companies can afford to pay 2 cents to 3 cents per bushel more for wheat than the elevator companies, because they do not require to consider the close of navigation.

There are at Rosthern seven large elevators and one small one.

Wheat begins to come in to the elevators from 15th to 20th September, and buying stops about 1st November at latest. The freight rate on wheat from Rosthern to Fort William on Lake Superior is 25 cents per cental (100 lbs.), which is equal to 15 cents per bushel. Oats are 28 cents per cental or 9⅓ cents per bushel.

Calendar for Rosthern District, 1892–1904.

Year.	Remarks.	
1892	Dry year.	Crop good in patches.
1893	Dry year.	Crop very good quality. Quantity fair.
1894	Dry year.	Crop very good.
1895	Dry year.	Frosts in fall. Bad crop. People poor and could not get in the crop early enough; although those farmers who were well enough off to employ assistance, got their wheat in in good time.
1896	Dry year.	Good crop.
1897	Dry year.	Good crop.
1898	Dry year.	Good crop.
1899	Wet year.	Fair crop, somewhat damaged.
1900	Wet year.	Pretty good crop, somewhat damaged.
1901	Wet year.	Good crop, not much damaged.
1902	Wet year.	Good crop, not much damaged.
1903	Wet year.	Good crop, not much damaged.
1904	Dry year.	

The soil of the Rosthern district is a light clay subsoil. There is little timber, and no spruce.

The foreign settlers in the Rosthern district subscribe to newspapers in their respective languages. The Germans read largely "Germania," the Hungarians "Szavadság," "Magyar Hirmondó," and "Amerikai Magyar

Népszava," all published in the United States. The Galicians read "Svaboda," a Galician paper in Ruthenish or Little Russian, published in Winnipeg. The German Catholics subscribe to "Katholischer," published in Dubuque, Iowa, U.S.A. The Mennonites have a paper called "The Canadian Farmer," which is published in the Mennonite interest.

The languages spoken within 30 miles of the town of Rosthern include Magyar, Slovàk, Czech, Polish, Ruthenish or Little Russian, Russian, Yiddish, German, French, and English.

Regina (in Assiniboia).—When the writer visited Regina in 1896 there was very little farming in the district. The soil was excellent, but the long series of dry years prevented settlement from taking place. The annual precipitation at Regina was about 1 inch less than at Calgary. Now the district in the immediate neighbourhood of Regina is well filled with farmers. The soil, though very hard to work, has turned out to be of exceptional richness and of extraordinary depth. Borings for wells have resulted in finding clay the same as the surface clay at a depth of 186 feet.

(vi.) Statistics of Immigration.

Statistics of immigration for the Dominion of Canada are very difficult to collect with any approach to accuracy, and almost impossible to compile in such a form as to give a comparative view of the immigration of successive years. The losses by emigration are almost, if not quite, impossible to ascertain.*

The reasons for the difficulty of collection lie in the immense extent of the frontier and in the great number of points at which it is possible for migrants to pass without being observed or without being distinguished from transient travellers. The rigidity of the United States immigration laws enables the authorities of that country to make an approximately accurate

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* The following shows the numbers of English and French Canadians respectively, resident in the United States at the Census of 1900.

Numbers having either one or both parents born as specified :—

	Total.	White.	Coloured.
Canadians, English	1,319,141	1,301,796	17,345
Canadians, French	812,621	810,105	2,516
	2,131,762	2.111.901	19,861

Number of white persons of parentage as specified born in Canada and resident in the United States :—

Canadians, English	440,640
Canadians, French	373,873
Total	814,513

	Canadians.	
	English.	French.
Percentage of white persons having both parents born as specified	51·9	78·4
Percentage of white persons having one parent born as specified	48·1	21·6
	100	100

The State in which the largest number of French Canadians are settled is Massachusetts, in which there are 244,586. The State in which the largest number of English Canadians is settled is Michigan. (U.S. Census Reports, 1900, Vol. I., pp. cxc. and cxciv.).

Against the total of Canadian born persons resident in the United States may be placed 127,899 persons born in the United States resident in Canada. 1901 Census Report, Vol. I., Ottawa, 1902, p. 417.

count of the persons entering the United States; but count of emigration is exposed to the same difficulties as is the case in Canada.

The arrival of immigrants from Europe at the Canadian ports—Halifax, St. John, Quebec, and Montreal—can within certain limits of accuracy be ascertained* from the year 1893; but until 1896 no attempt was made to enumerate the arrivals by railway and by prairie trail into the North West direct from the United States.† The difficulties in compiling such immigration statistics as exist for the earlier years lie in the constant variations in constituents and in mode of presentation.

For the reasons explained the following table gives only an approximate idea of the immigration into Canada during the years from 1875 to 1891. It includes the numbers of settlers who have entered their effects at the Canadian custom-houses and others known to arrive without doing so; but it does not include the settlers arriving by trail or by rail, excepting where their intention of settling in the country has been intimated to the immigration officials.

TABLE showing the ARRIVALS of intending SETTLERS in CANADA in so far as intimated to the IMMIGRATION OFFICERS during the years from 1875 to 1891.‡

1875	27,382	1884	103,824
1876	25,633	1885	79,169
1877	27,082	1886	69,152
1878	29,087	1887	84,526
1879	40,492	1888	88,766
1880	38,505	1889	91,600
1881	47,991	1890	75,067
1882	112,458	1891	82,165
1883	133,624		

As regards immigration during this period into Manitoba and the North-West Territories, the only inquiry which has been made into the subject, so far as the years between 1882 and 1886 are concerned, was made in 1890 by Mr. Lowe, then Deputy-Minister of Agriculture for the Dominion.§

He gives the following statistics of the immigration into Manitoba and the North-West Territories for the six years in question.

1881	22,001
1882	58,751
1883	42,772
1884	24,040
1885	7,240
1886	11,599
Total	166,403

Of these 166,403 immigrants, he considers that about one half were migrants from the eastern provinces of Canada, and that the remainder were from Great Britain and from foreign countries. This addition to the population does not, however, appear in the Census Returns, which disclose a population in 1881 of 118,706, and in 1886 of 196,424, or an increase of 77,718 only.

* Reports of the Immigration Officers at these ports, published in the Annual Reports of the Department of the Interior. *See also* p. 30.

† The practice of taking note of the immigration from the United States into Montreal, which had been in use for some years, was suspended in July 1892.

‡ Report of the Department of Agriculture, Sessional Papers Nos. 6 and 7, Ottawa, 1891 and 1892.

§ Sessional Papers, No. 6,* Ottawa, 1890, p. 11.

Apart altogether from the natural increase of the population, it would appear either that the immigration statistics were over estimated or that a large number, more than one-half of the number of immigrants, had entered the country and left it again. Probably both of these incidents occurred. The construction of the Canadian Pacific Railway drew large numbers of persons into the country. Mr. Lowe estimates the immigration from this cause alone up till 1884 at 40,000, and suggests that, before the census was taken, the bulk of these people, at any rate those who were employed in railway construction, went westwards into British Columbia, when the section of the railway which traversed the plains was finished. Moreover, it may be added that the labourers who were employed on the construction, as is usual in such cases, were of migratory habits, and that many of them drifted into the country, remained for two or three months, and then drifted out again.

The administration of immigration and the collection of immigration statistics was in the hands of the Dominion Department of Agriculture until March 1892, when it was transferred to the Department of the Interior. The system was re-organised at that date,* and its organisation was further developed in 1896–97, when the Hon. Clifford Sifton became Minister of the Interior.

Statistics for the period from 1892 to 1904 are given in the following table. They do not include all immigration into Canada, but only the immigrant arrivals at the Canadian seaports. They are useful for comparison so far as concerns the period to which they refer, but they are not valid for comparison with the figures given above, as they have been compiled on a different basis.

TABLE showing the NUMBERS of IMMIGRANT ARRIVALS at the PORTS of ST. JOHN, HALIFAX, QUEBEC, and MONTREAL, for SETTLEMENT in CANADA during the years from 1892 to 1904.†

1892	31,271
1893	29,632
1894	20,829
1895	18,314
1896	16,835
1897	19,304
1898	22,781
1899	32,598
1900‡	16,541
1901	34,149
1902	44,317
1903	81,095
1904	87,656

From 1897, the statistics of the Immigration Office at Winnipeg give a clearer idea of the numbers and places of origin of immigrants into the North West than is obtainable for earlier years. Even now, however, a large number of immigrants escape statistical record. Many of those who enter Canada by the Minneapolis and St. Paul (or Soo line), and by the Alberta Railway, as well as those who cross the frontier in covered wagons (known as prairie schooners), do not come to the knowledge of the authorities unless they make application for homesteads.§ For this reason the list of applications for homesteads is a more reliable guide, although farm labourers and their families are in that case excluded.

* Report of Department of Interior, Sessional Papers, No. 13, Ottawa, 1893, p. x.
† Information furnished by the Department of the Interior, Ottawa.
‡ From 1st January to 30th June only, the statistical period having been changed.
§ For numbers of applications for homesteads, *see* p. 25.

TABLE showing the NUMBER of IMMIGRANTS arriving at WINNIPEG, with their places of origin and declared destinations, during each fiscal year from 1897 to 1903.*

—	1897.	1898.	1899.	1900.†	1901.	1902.	1903.
Canada:							
Eastern Provinces	2,373	13,112	11,591	8,423	8,604	12,530	17,286
United States:							
Returned Canadians	—	—	—	318	1,368	2,102	3,462
Newfoundland	—	—	—	—	21	21	10
West Indies	—	—	—	—	11	—	21
Australasia	—	—	—	—	—	4	26
Great Britain:							
England	1,519	3,203	2,793	1,563	2,892	6,279	19,892
Wales			40	34	70	386	445
Scotland	205	701	613	338	992	2,903	5,525
Ireland	69	266	270	189	340	1,187	2,475
Continental Europe:							
Austria-Hungary	4,363	5,509	7,442	4,847	5,680	6,829	12,017
Bohemia				45	16	109	215
Bulgaria	—	—	—	—	—	1	6
France	383	368	215	223	205	370	972
Belgium			59	58	99	186	239
Germany‡	520	998	1,405	1,250	2,251	5,650	12,367
Greece	—	—	—	—	2	54	38
Holland	—	—	11	—	16	40	189
Italy	—	—	210	135	479	1,874	2,048
Portugal	—	—	—	—	1	2	2
Roumania	—	—	—	—	148	117	113
Russia	28	—	288	460	379	400	1,086
Poland	—	—	95	35	224	306	643
Finland	—	—	179	73	328	355	1,285
Doukhobors	—	—	7,427	—	—	13	4
Scandinavia	474	532	1,133	672	2,501	5,679	12,969
Spain	—	—	—	—	2	—	1
Switzerland	—	—	—	—	20	45	141
Asia:							
Turkey (Armenians)	—	—	—	—	—	8	1
„ (Arabs)	—	—	—	—	1	1	2
„ (Syrians)	—	—	—	—	17	22	46
Persia	—	—	—	—	—	2	28
China (Chinese)	—	—	—	11	1	1	20
North America:							
United States (U.S. Citizens)	712	2,643	2,233	2,402	5,197	7,783	13,435
South America:							
Brazil	—	—	—	—	—	22	—
From unspecified countries:							
(Jews)	—	—	111	33	138	198	376
(Negroes)	—	—	—	—	—	6	12
(Half-breeds)	—	—	—	—	1	1	—
Undesignated	218	525	60	114	—	—	4
Total	10,864	27,857	36,175	21,216	32,005	55,095	107,401
Destined for the United States	Not given		10	45	29	1,089	4,959
Colonists destined for Canada as under (minus Tourists)	Not given		36,165	21,171	31,976	54,006	102,442
For Manitoba	Not given		19,457	9,465	12,456	21,484	48,149
„ North-West Territories			12,384	9,539	14,461	26,440	49,203
Total for North-West			31,841	19,004	26,917	47,924	97,352
For British Columbia			3,969	1,948	4,336	4,895	5,206
„ Yukon			251	137	381	248	103
„ Ontario			104	82	342	1,085	2,910
Undesignated			—	—	—	20	—
			36,165	21,171	31,976	54,172	105,571
Tourists	—	—	—	—	—	166	3,129

* Compiled from the Annual Reports of the Department of the Interior.
† From 1st January to 30th June only, the statistical period having been changed to conform to the Fiscal Year.
‡ Including Germans from Austria and Russia.

The following table shows the number of immigrants into Canada in 1902–3 and 1903–4 (years ending June 30th), and for the first six months of the fiscal year 1904-5 :—*

IMMIGRATION INTO CANADA.

Countries.	Fiscal Years. 1903.	Fiscal Years. 1904.	1904. Six months, July to December.
From United States: Returned Canadians only	4,696	4,432	†—
„ Newfoundland	335	519	120
„ West Indies (British)	17	52	36
„ Australasia	46	58	64
„ Great Britain—England and Wales	32,510	36,694	17,852
Wales (where separated)	—	—	265
Scotland	7,046	10,552	4,155
Ireland	2,236	3,128	1,694
„ Continental Europe :—			
„ Scandinavia — Norway (where separated)	1,746	1,239	585
„ Scandinavia — Sweden „	2,477	2,151	931
„ Scandinavia — Denmark „	308	417	151
„ Scandinavia — Iceland „	917	396	193
„ Germany (including Germans from Austria and Russia where not separated).	1,887	2,985	1,273
„ France	937	1,534	970
„ Belgium	303	858	227
„ Austria—			
Austria (not elsewhere specified)	781	516	196
Galicia (where separated)	8,382	7,729	703
Bukowina „	1,759	1,578	133
Bohemia „	16	91	36
Hungary „	2,074	1,091	276
„ Italy	3,370	4,445	288
„ Bulgaria	7	14	2
„ Russia	5,505	1,955	610
Poland (where separated)	274	669	314
Finland „	1,734	845	487
Doukhobors „	—	—	4
„ Holland	223	169	48
„ Spain	7	5	8
„ Portugal	—	—	—
„ Roumania	437	619	126
„ Switzerland	73	128	55
„ Greece	193	191	46
„ South America—Brazil	—	2	—
„ Asia—Turkey (Armenians)	113	81	40
Do. (Arabs)	46	58	25
Do. (Syrians)	847	347	491
„ Persia	40	5	8
„ China (Chinese)	—	—	—
„ United States	44,777	40,797	18,185
From unspecified countries—			
Jews	2,066	3,727	4,572
Negroes	—	—	—
Half-breeds	—	—	—
Undesignated	179	254	63
Total	128,364	130,331	55,232
Destinations :—			
Manitoba	—	34,911	10,181
North-West Territories	—	40,397	14,731
Total to North West	—	75,308	24,912
Ontario	—	21,266	13,099
British Columbia, including Yukon (only a very few to Yukon).	—	6,994	3,504
Quebec, Maritime Provinces and undesignated	—	26,763	13,717
‡United States	—	—	—
Tourists	3,433	—	—

* Information from the Department of Interior, Ottawa.

† Not given.

‡ The figures in this statement deal with immigration into Canada, according to the heading. None of the immigrants above classified were for U.S.

In the foregoing tables it will be observed that the immigration from Great Britain has increased very greatly during the past few years, that the immigration from Austria-Hungary has continued to be very considerable, and that the immigration of Jews has increased materially.* The immigration from the United States into the North West has risen from 712 in 1897 and 5,197 in 1901 to 36,010 in 1904.†

The number of persons who went from the eastern provinces of Canada to Manitoba and the North-West Territories was as follows‡ :—

For the fiscal year 1902–03	18,781.
„ „ 1903–04	18,162.
For six months, July–December 1904	9,286.

The following table, compiled from the Census Returns of 1901,§ is of interest in connection with the study of the settlement of the country.¶

TABLE showing the DATES of IMMIGRATION of IMMIGRANTS LIVING in MANITOBA and the NORTH WEST TERRITORIES on 31st MARCH 1901, in so far as these dates were reported.

When Immigrated.	Manitoba.	North-West Territories.	Total.
Before 1851	1,789	499	2,288
1851–1855	861	295	1,156
1856–1860	978	274	1,252
1861–1865	714	272	986
1866–1870	1,314	550	1,864
1871–1875	4,763	1,244	6,007
1876–1880	4,409	1,086	5,495
1881–1885	8,083	3,935	12,018
1886–1890	11,598	6,483	18,081
1891–1895	12,096	11,540	23,636
1896–1900	24,567	34,049	58,616

The following table gives the status as regards citizenship of the foreign born population. It is shown by this table that the immigrants who become naturalized most rapidly are those from the United States, Germany, Iceland, and Norway and Sweden. Galicians are becoming naturalized with a rapidity not quite so great; Russians, Italians, and Chinese are reluctant to give up the citizenship of their native country.

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* In the six months, July–December, the immigration of Jews was as follows:—

From Russia	3,575
„ Poland	121
„ Austria	162
„ Germany	102
Not specified	612
Total	4,572

Only 557 of these went to Manitoba and the North West, the remainder went to the Eastern provinces.

† Information from the Department of the Interior.

‡ *Ib.*

§ Bulletin VIII., Fourth Census of Canada, 1901, pp. 2 and 3.

¶ *See also* Population Statistics, p. 80.

TABLE showing STATUS of FOREIGN BORN POPULATION in CANADA as a whole.*

Country of Birth.	Total Number.	No. of Aliens.	No. Naturalized up till 1901.
Austria-Hungary (mainly Galicians)	28,409	19,207	9,202
Belgium	2,279	1,007	1,272
China	17,043	16,379	664
Denmark (including Iceland)	8,132	2,927	5,205
France	7,936	3,028	4,908
Germany	27,302	6,486	20,816
Greece	213	116	97
Holland	385	188	197
Italy	6,832	5,180	1,652
Japan	4,674	3,607	1,067
Norway and Sweden	10,258	4,227	6,031
Roumania	1,065	752	313
Russia	31,226	20,014	11,212
Spain and Portugal	270	107	163
Switzerland	1,211	386	825
Turkey	1,613	1,115	498
United States	127,891	43,398	84,493
Other Countries	2,065	83	1,982
Total	278,804	128,207	150,597

IV.—The Agricultural Exploitation of the North West.

(i.) LITERATURE OF THE SUBJECT.

The development of agriculture and the extent to which the resources of the country are being exploited may, perhaps, best be studied, so far as documentary evidence goes, in several series of reports issued by the Dominion and by the Provincial and Territorial Governments. These reports are as follows:—

Dominion Government Reports:—

1. Reports of the Department of Agriculture, including Appendices, *e.g.*—
   (*a.*) Reports of the Experimental Farms, including Bulletins issued from time to time on special subjects.
   (*b.*) Reports of the Dairy Commissioner.
2. Reports of the Select Standing Committee (Dominion Parliament) on Agriculture and Colonisation, with frequent Appendices.
3. Reports of the Census, 1900, especially Bulletins XIV. and XV.

Provincial and Territorial Governments' Reports:—

1. The Reports and Bulletins of the Department of Agriculture and Colonisation of the Province of Manitoba.
2. The Reports and Bulletins of the Department of Agriculture of the North-West Territories.

In addition to these reports there are two groups of reports, made in 1880 and in 1890, by Tenant Farmers' Delegates from Great Britain, who visited the North West and set down their general impressions.† Some information may also be obtained from the Reports of the Boards of Trade of Winnipeg, Brandon, and Calgary, and from the Reports of the Grain and Produce Exchange of Winnipeg.

* Census Bulletin, VIII., p. 11.

† "Reports of Tenant Farmers' Delegates on the Dominion of Canada as a Field for Settlement," Ottawa, 1880; and "Tenant Farmer Delegates' Visit to Canada in 1890, and their Reports upon the Agricultural Resources . . .," Ottawa, 1892.

(ii.) Farming in Manitoba, 1876–1884.

As described in the section on Settlement, the early farming settlers in Manitoba came from Ontario. They were thus not unaccustomed to pioneer farming, although the conditions in Manitoba were different in many ways from those in Ontario. The Ontario pioneer had to clear his farm, for the country was almost wholly covered by dense forests, whereas the Manitoba pioneer had the open prairie before him, ready at once for the plough.* He encountered, however, serious difficulties in his early settlement. Frosts early and late, drought, plagues of grasshoppers, and scarcity of farm labour† rendered his establishment difficult. Men, animals and plants had alike to be acclimatised, and new methods devised for combating new conditions.

A mistake, very natural under the circumstances, was made by many of the best farmers. Having sold their Ontario lands, and, finding themselves in possession of sometimes a relatively considerable amount of capital, they took up in Manitoba more land than they could, under the then conditions, possibly cultivate with economy. In course of time this has been remedied, the very large farms have been broken up into smaller ones, and farm management has by this means been greatly improved.

By way of affording means of comparison of earlier with later methods, the plan adopted by intelligent farmers in Manitoba in the seventies and eighties, and still adopted by some, may be described.

The virgin soil was turned over "in the early summer," the surface being merely pared. The furrow was then "backset" after harvest, ploughing about a depth of 3 inches, and turning over a very broad furrow, varying from 12 to 16 inches in width.‡ The yield under these conditions was high. On one large farm the wheat crop was, in 1877, 41 bushels per acre, and, in 1878, 36 bushels.§ While, on farms of moderate size skilfully managed, the fertility of the soil was more or less fully taken advantage of by intelligent and experienced farmers with a sufficient capital, it cannot be said that at this period such conditions were universal. Free grant and low-priced lands always contribute to the occupation of these lands by a certain proportion of inferior farmers.

The result was inevitable and disappointing to those who had built their hopes upon the undoubted fertility of the soil.

In 1884 farming was in "a most depressed condition," and a Committee was appointed by the Dominion Parliament to inquire into the causes of the depression. "Careful investigation led to the conclusion that the lack of "success was not due to any fault in the climate or soil of the country, nor "to a lack of industry among the farmers, but to defective farming, to want "of skill and knowledge in all departments. There was a lack of information as to proper preparation of the soil, the maintenance of its fertility, "to a suitable rotation of crops, and as to selection of the best varieties of "farm crops for sowing. There was a great want of a fuller knowledge "regarding stock-breeding and the adaptability of breeds to particular "conditions. . . . There was a deplorable lack of knowledge as to the

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* There can be no doubt that the slowness of the early development of Canada, compared with that of the United States, has been due to the fact that the readily accessible regions of the country were covered with dense forests, while the open prairies were very remote. This circumstance led Sir James Caird, writing in 1859 ("Prairie Farming in America, with Notes by the Way on Canada and the United States," [New York edn.], 1859) to institute a comparison, unfavourable to Canada, between Canada and the United States, especially the State of Illinois. *See*, however [Hutton, William, Secretary, Bureau of Agriculture, Toronto] "Caird's Slanders on Canada Answered and Refuted," Toronto, 1859.

† Although this variety of labour seems to have been fairly plentiful between 1877 and 1880: for example, wages are reported to have been $40 (about 8*l.*) per annum with board, and Indian labour about 2*s.* per day, figures which do not indicate scarcity. *See* "Reports, Tenant Farmers' Delegates," 1880, p. 23.

‡ Report on Burnside Farm (2,400 acres), Manitoba, in "Reports of Tenant Farmers' Delegates," 1880 [Cowan, George, of Glenluce, Wigtonshire], p. 23.

§ *Ib.* The variety was Fife wheat. *See* below p. 40.

" insects and diseases from which the farmer suffers large losses in crops. " Also in regard to common weeds which sometimes overrun his fields, and " rob him of a large proportion of the fruits of his toil."*

Empirical and imitative methods, useful under long-standing conditions, were too slow in their adjusting movements in a new country, ambitious to cultivate for export, and subjected to the competition of a slightly older country immediately to the south. It was, therefore, necessary that the farmer should be enabled to avail himself of the scientific skill which he did not himself possess, by establishing a system of scientific experiment and advice which might be placed gratuitously at his disposal.

(iii.) Farming in Manitoba and the North-West Territories, in 1884–1904.

The result of the inquiry by the Committee of 1884 was the establishment by the Dominion Government of a series of experimental farms; one was established at Ottawa, a second at Brandon for Manitoba, and a third at Indian Head for the North-West Territories.†

The system as now developed enables any farmer to make inquiry, without even the cost of postage, about any matter relating to his business, and enables him also to receive gratuitously small supplies of selected seed, trees, &c. He can also for a small payment procure from the experimental farms, under certain conditions, pure bred stock.‡ Connected with these methods of encouraging agriculture is the system by means of which, for a uniform payment for carriage of $5 (about 1*l.*) per head, a farmer in the North West may have delivered to him at any part of Manitoba or the Territories, pure bred stock from Ontario.

For nearly 20 years extensive experiments in the selection and "breeding" of varieties of cereals, in the crossing of fruit trees, and in finding the best conditions for growth, have been carried on at all the experimental stations. Experiments are also undertaken under the auspices of the farm authorities at many places throughout Manitoba and the Territories.

It is impossible to overrate the enthusiasm and ability with which this remarkable work has been carried on, at an extremely small cost, when considered in relation to the benefits which have accrued. It is not too much to say that anyone who is ignorant of the farming conditions, or of the methods recognised by scientific experience as appropriate, is culpably ignorant. He can, if he will, get his knowledge by return of post for nothing. He can not, of course, get experience; that he must acquire for himself: but he may often save the difference between failure and success if he is competent to apply the knowledge he can get so easily.

The effect of 20 years' experimentation and wide distribution of the results of intelligent effort, is very manifest. No doubt the farmers who least need the assistance of the scientific expert are those with whom his services are in most demand, yet even some of the newest comers, who most need friendly aid of this kind, apply for it and utilize it. The heterogeneity of the population, which has migrated to the Canadian plains, as shown in the section on Settlement, suggests that notwithstanding all that is being done, the skilful farmer may still be in the minority. Even if the methods of agriculture in Galicia and Russia were less primitive than they are, much would still remain to be learned by the peasant who begins to cultivate in the West.

Ignorance of the language in which the knowledge of farming conditions in the West is conveyed is undoubtedly a drawback; but the tendency to imitation is strong, and in Western life there is a powerful social feeling which impels the better-informed and more experienced farmer to help the new comer.

* Saunders, Dr. William, in evidence before Select Committee on Agriculture and Colonisation, 1903. Appendix No. 2, pp. 97, 98.

† Saunders, Professor, "Agricultural Colleges and Experimental Farm Stations," Ottawa, 1886.

‡ Although this is now, to a large extent, left to private enterprise.

An indication has already been given of the method in use in the eighties of preparing the ground for crop. Methods now adopted vary in different parts of the wide area, but in Manitoba and in a large portion of Territories, the best practice is as follows:—One-third of the cultivated land is left fallow each year; "the system of fallow most approved is to plough " deep, 7 to 8 inches, before the last of June, and to cultivate the surface " several times during the growing season to destroy weeds. By this treat- " ment the moisture in the soil is economised and the land largely cleared " from weeds. The crops on summer-fallow, even if the total cropping area " is thus made somewhat smaller, are so bountiful that greater profits are had " with less labour."*

The writer found in the course of his inquiries that this practice is very widely distributed throughout the North West. In some of the newer districts, however, where labour other than that of the farmer and his family, is not procurable, and where animals (horses or oxen) are scarce, modifications of this method, or other methods, less obviously economical in the long run, were found to be prevalent. For example, some farmers simply leave the stubble in the ground until the fall of the year and then plough; others drill the seed in on the stubble in the spring,† ploughing of course for the third year's crop, or in some cases summer-fallowing. In the case of seed drilled in on the stubble, the yield is not so great as in the first year when the ground is cultivated, but the deficiency (say 5 to 6 bushels per acre) is regarded as not quite balancing the extra cost of cultivation were that undertaken each year.

While the system of summer-fallowing retards the exhaustion of the soil and meanwhile produces more abundant crops, it does not directly enrich the land. On the specialist wheat farms there is no animal manure, or none sufficient for the enrichment of extensive areas, artificial manures are too expensive, and thus where he enriches at all, the farmer is thrown back on other means.

A practice with which the Ontario farmer was familiar in early days‡ is now adopted to some extent in Manitoba, viz., the ploughing in of clover. The clover is not sown with the grain, as is done in Ontario, but is sown as a separate crop. Instead of summer-fallowing the land, clover is sown in the spring and ploughed under in the autumn.* Dr. Saunders, the Director of Experimental Farms, reports that this method "has been tried for " three years; but the soil (of the North West) is so rich on the prairies and " contains so much surplus of nitrogen that no benefit from the use of clover " has yet been perceived." . . . . "There is no need of it at present, " because all the plant food needed by the crops is already in the soil and is " stored up there in great abundance."§

In the eastern portion of the Territories, for example at Indian Head, where with great stretches of rich land, there are some poor areas, the ploughing in of clover seems to be practised to advantage.

Rotation of crops is practised to a slender extent. The chief difficulty is that districts that are suitable from a physical and from an economical point of view for the cultivation of one crop are not always suitable for the production of other crops customarily employed in rotation. Thus the wheat regions are not always either physically or economically the best for the growth of oats or barley and vice versa. Seed selection and acclimatisation

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* Saunders, Dr. William, Evidence, &c., Select Committee on Agriculture and Colonisation, 1903, Appendix No. 2. *See also* Mackay, Angus, Report on Experimental Farm at Indian Head, North-West Territories, 1902.

† This is similar to the practice common 50 years ago in Illinois, where the stubble of maize was similarly left to hold the snow and thus protect the young wheat shoots when they come up. *See* Caird, James, "Prairie Farming in America," &c., 1859, p. 78.

‡ "On the best land wheat and clover are often taken in alternate succession, the clover being " ploughed down in the hot summer weather, when the weeds are easily and cheaply destroyed, " while the clover gives condition to the land for the wheat crops." Caird, James, "Prairie Farming in America," &c., 1859, p. 27.

§ *Id. See also* Saunders, W., and Frank T. Shutt, "Clover as a Fertilizer," Bulletin No. 40, Central Experimental Farm (Ottawa), 1902.

may do much to change these conditions; but the absence of a proper system of rotation is a disadvantage which increases with time, and with the progressive exhaustion of the soil by the existing methods of cultivation.

The great advantage of early sowing is now so generally recognised that everywhere strong efforts are made to get all ploughing done in the fall.*

"The average of ten years' experience in early, medium, and late sowing " at Ottawa has shown that with wheat a delay of one week after the " ground is in good condition to receive the seed has entailed a loss of " over 30 per cent., two weeks 40 per cent., three weeks nearly 50 per cent., " and four weeks 56 per cent. of the crop."†

Quite as important as the preparation of the soil and readiness to begin the operation of sowing is the choice of seed. Indeed it may be said that in a new country this is the first point in good husbandry.

(iv.) Cultivation of Wheat.

Wheat is not only not indigenous to the North West, it is an exotic in America, and its behaviour in a relatively new habitat is still subject of observation and experiment. On the whole it would appear that Russian wheats suit the continent of North America better than any others. "In " general, regions possessing black prairie soils and characterised by violent " climatic extremes, especially extremes of heat and drought, produce wheats " that are hardiest, have the hardest grains, and are the best in quantity and " quality of gluten content." "Considering all qualities, the best wheats of " the world are of Russian origin, coming particularly from eastern and " southern Russia, the Kirghiz steppes and Turkestan."‡

Different parts of the American continent present different conditions for the growth of plants, and thus varieties of wheat which flourish in Texas are killed by the frosts of the Dakotas, and the hard wheats of Dakota are unable to withstand the climate of the Pacific coast. The wheat districts have been approximately determined.§ The Canadian North West may be said in general terms to be divisible from this point of view into at least two districts. (*See* Diagrammatic Map on p. 39.) The smaller one to the west may perhaps ultimately be regarded as the irrigated wheat area, and the larger one, towards the east, may be described as the region of hard spring wheat.‖ This region forms the more northerly part of the continental area of hard spring wheat, which extends from the centre of Iowa and Nebraska northwards and includes parts of Wisconsin and Minnesota and the whole of North and South Dakota. The most fertile portion at present of this whole area is the Red River Valley, partly in Minnesota and the Dakotas, and partly in Manitoba.

The efforts of the directors of the experimental farms have been directed towards the selection and improvement of the varieties of wheat with a special view to the conditions of the North West. There are numerous varieties of hard spring wheat upon which experiments are constantly being made. It is gratifying to know that the average yield as shown by the statistics of Manitoba and the North West is very considerably in excess of the average yield in the corresponding States to the south. The average yield in Manitoba may be considered as 18 bushels per acre,¶ while the average yield in the hard spring wheat district in the United States is only about 13 bushels per acre.** This relatively small yield is attributed to a variety of causes. The system of "bonanza" farms is said to result in

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* On the effect of this upon the marketing of grain, *see* p. 102.

† Saunders, Dr. William, Evidence before Select Committee on Agriculture and Colonisation, 1903, Appendix No. 2, pp. 98–99. So also with oats, although to a less extent [*see id.*]. *See also* Bulletin No. 8, Central Experimental Farm, "Results of Early Seeding, &c.," (Ottawa), 1891.

‡ Carleton, M. A., Cerealist, Division of Vegetable Physiology and Pathology, United States Department of Agriculture, Bulletin No. 24, Washington, 1900. *See also* "Russian Cereals adapted for Cultivation in the United States," Bulletin No. 23, 1900.

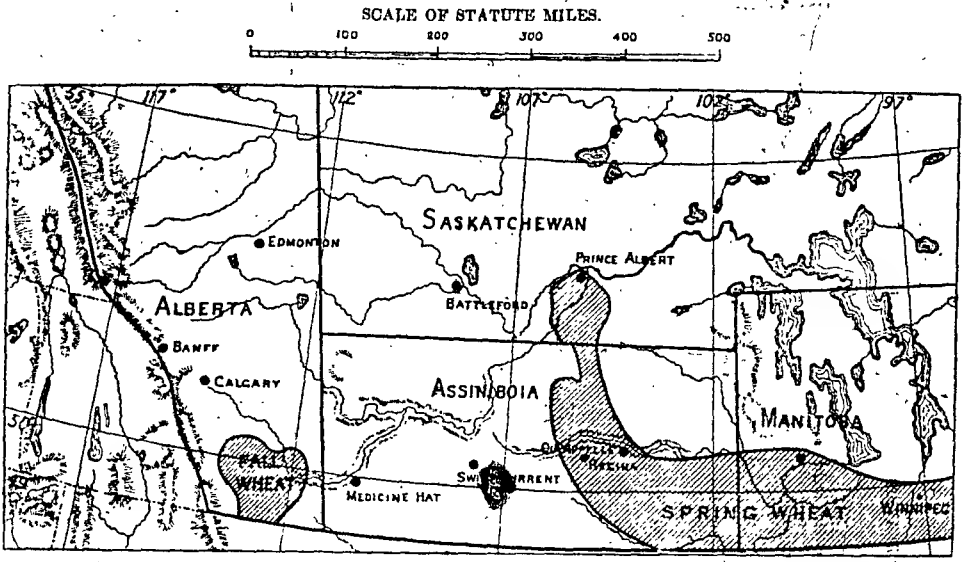
§ *See* chart in Bulletin No. 24, cited above.

‖ Spring wheat is wheat sown in spring; fall wheat is wheat sown in autumn.

¶ *See* p. 64.

** Bulletin No. 24, cited above, p. 28.

DIAGRAMMATIC MAP showing AREAS in which FALL and SPRING WHEAT are at present cultivated in quantity.



poor tillage, in waste of land, in weeds being allowed to grow, in degeneration in the quality of the grain, and in general absence of effective supervision.* On the other hand it is also alleged that the educated farmer is abandoning wheat growing and is devoting himself to diversified farming.† The drudgery of wheat growing is thus left to the large farm upon which uninterested "hands" are employed with the result that there is no stimulus to increased production and little knowledge how to accomplish it. It is possible also that the soil of Manitoba and the West is more fertile, and that the climatic conditions are at least not more unfavourable than those of the States in the hard spring wheat district of the United States.

The system of "bonanza" farms does not exist in Canada, the farms are of moderate size, and they therefore enjoy the advantage of close personal attention, and this, coupled with the growing interest in the best farming practice, is sufficient to account for the greater productivity.

The experiments which have for some years been conducted at the experimental farms at Brandon in Manitoba, and at Indian Head in the North West Territories, show what can be done, even in unfavourable seasons, by intelligent methods. The yields of wheat of all varieties have been greatly in excess of the average yield of the region, and they have been approached only by some of the best farmers in the respective districts. In view of the great amount of recent immigration the experimental farms have thus had thrust upon them a great deal of educational work which may fairly be described as elementary.

The varieties of wheat which are at present principally in vogue in the North West are set forth in the following table (p. 40). The details are extracted from the tests made in 1902 at the experimental farm at Brandon, except where otherwise specified. The comments are by various authorities.

* Bulletin No. 24, cited above, p. 16.

† "The days of exclusive wheat farming are rapidly passing away. Farmers that five years ago were wedded to small grain are now paying more attention to corn, dairying, and fruit raising. The Tri-State Farmers' Conventions and Farmers' Institutes are largely responsible for this beneficent change of sentiment. The additional profit of diversified farming and rotation of crops has been so forcibly impressed upon the minds of those so fortunate as to be able to attend these meetings, that the old prejudice against products that require cultivation is rapidly disappearing, and in its place is developing a tendency to pay more attention to the scientific principles of agriculture and a desire to profit by the experiments and experience of the workers in the agricultural colleges and advanced farmers."

Seventh Biennial Report of the Commissioner of Agriculture and Labour of the Governor of North Dakota. Bismark, N.D. [U.S.A.], 1903, p. 7.

Table Illustrating the Nature of the Principal Varieties of Wheat grown in the North West.

Name of Variety.	Date of Ripening.	No. of Days Maturing.	Length of Straw.	Length of Head.	Kind of Head.	Yield per Acre.	Weight per Bushel.	Whether Rusted.	Average yield in Eight Years at all Experimental Farms.	Average Yield in Five Years at Indian Head.	Notes.
			inches	inches		bu. lbs.	lbs.		bu. lbs.	bu. lbs.	
Red Fife	Aug. 28	120	49	3½	Beardless	31 0	60	Slightly	33 16	32 46	The favourite N.W. wheat; but late in ripening and thus liable to be injured by early frosts.
White Fife	Aug. 30	121	52	3½	„	35 20	60	„	33 23	34 14	Worth, as a rule, 2 cts. (1*d.*) per bushel less than Red Fife.
Wellman's Fife	Aug. 28	115	53	3½	„	30 0	60	„	33 36	33 14	This variety is extensively grown in Dakota.
Huron	Aug. 28	114	42	4	Bearded	25 40	60	Badly	33 37	—	——
Rio Grande	Aug. 27	114	50	3½	„	29 50	61	Slightly	33 59	—	——
Goose	Aug. 31	118	53	2½	„	44 40	64	None	31 14	42 46	Exported to Italy for manufacture of macaroni; not used to any extent in Canada. Price lower than White Fife.
Preston	Aug. 27	113	43	3½	„	25 0	60	Sligltly	34 59	—	The most productive variety in eight years' tests. Average of eight years, 3¾ days earlier than Red Fife with a gain in yield of 1 bu. 43 lbs. per acre.
Stanley	Aug. 27	119	47	2½	Beardless	31 20	60	Considerably	—	31 30	——
Percy	Aug. 20	112	50	3½	„	29 20	59	Slightly	—	29 32	——
Blue Stem	Aug. 30	122	53	3½	„	27 40	58	Badly	—	—	This variety is extensively grown in Dakota.
Monarch	Aug. 27	119	55	4	„	34 40	60	Slightly	—	35 24	——
Crown	Aug. 26	113	47	3	Bearded	33 40	60	„	—	34 30	——
White Connell	Aug. 27	119	50	4	Beardless	32 0	60	„	—	33 8	——
White Russian	Aug. 30	122	50	4	„	33 20	59	„	—	33 7	——
Dufferin	Aug. 26	113	51	3½	Bearded	31 0	60	„	—	30 48	——
Hungarian	Aug. 28	115	52	4	„	23 50	63	„	—	28 38	——
									(4 years average.)		
Early Riga	Aug. 18	110	45	3½	Beardless	28 20	59	„	30 45	—	The earliest wheat yet experimented with, obtained by crossing an Indian wheat from a high altitude in the Himalayas with Onega, a Russian variety from Archangel, 8¾ days on the average of four years earlier than Red Fife with a loss of 2½ bushels per acre.

The circumstance that late and early frosts are not dreaded to the same extent as in former years has led to the belief that the climate has been modified by settlement and cultivation. This, though a popular opinion, is not a tenable one. Cultivation no doubt affects the local influence of ground frost by changing the moisture conditions and the land thus becomes less amenable to frost; but the total cultivated area, even in the well-settled districts, is too small in proportion to the whole for any general climatic effect to be produced, even if this were possible from such a cause. The process of acclimatisation has, however, diminished, alike for men, animals, and plants, the sensible effects of climatic changes, and further results of this kind may be looked for.*

There can be little doubt that the cultivation of cereals may, so far as physical conditions are concerned, be gradually pushed northwards by the intelligent co-operation of the "cerealist" and the farmer; but the general economic conditions, which cannot be prophesied, must determine the extent to which production takes place on a large scale for the export market.

The growing miscellaneity of agricultural production in the United States may be expected to be imitated in Canada in so far as the climatic conditions permit. This miscellaneity has been responsible for the absence, for the time being, at all events, of expansion in wheat production in the United States, and may also be responsible for the absence of expansion in wheat production in Canada. The "American invasion" may facilitate this in so far as this invasion consists of "good farmers," that is, farmers who have been in the habit of following the current practice in farming in the United States.

(v.) Cultivation of Oats.

Next to wheat the most important crop in the North West is oats. Reference to the statistical tables for Manitoba will show that in 1883 the area under oats amounted to 40 per cent. of the area under crops. This proportion has since diminished, when the whole region is considered. The new settler, however, requires large quantities for the horses which are employed to "break" and cultivate his new land. Thus in all the districts into which new settlement has been going there has been great encouragement to the production of oats by the earlier settlers on account of the local demand. In some parts of the country oats have risen on occasion to a high price. This has been especially the case in the regions remote from the railway lines. The relatively high prices of 50, 60, and 70 cents per bushel were readily obtainable in the summer of 1904 for oats, for example, in the Battleford district, which is 100 miles from a railway; and for a short time even $1 per bushel was paid in remoter districts.

The local demand was also increased by contractors engaged in railway construction, notably at the crossing of the Saskatchewan for the Canadian Northern Railway, and at the new branch lines on the Calgary and Edmonton Branch of the Canadian Pacific Railway. There can be no doubt that a great stimulus to the production of oats has been given by these two classes of demand, and that the quantity of land which will be cultivated in oats next season (1905) will be considerably greater than the quantity so cultivated in 1904. The portions of the country specially suitable for the cultivation of oats may be said to lie along the northern limit of the certain wheat crop area,† of course overlapping that area, that is to say, approximately, from the Duck and Riding mountains to the Edmonton district.

The principal drawback in the cultivation of oats within this region is that, owing to indifferent farming, the seed has been allowed to get into a "dirty" condition, and to become much mixed with seeds of other crops and

* For example, a few years ago the cultivation of maize, or Indian corn (known as corn in America), in the northern states of Dakota, was looked upon as an impossibility, but now a large quantity of corn is produced in that State. During the past few years efforts have been made to establish this grain in the North West Territories. There seems to be no doubt that selection of suitable varieties and the gradual acclimatisation of them will result in the growing of corn in quantities for the fattening of cattle. Hitherto the absence of corn in the North West has prevented the proper "finishing" of cattle for the market. *See* Experiments at Indian Head, North West Territories, Report, Experimental Farm, 1903, p. 329.

† As shown, for example, in map accompanying Estimate on p. 76.

of weeds. Only by careful screening, treatment with formalin or some other agent to prevent "smut," and even picking of the seed by hand, can this condition of matters be improved. The relatively high price, and the prospectively very considerable local demand, make oats so profitable that it is well worth the while of the farmer to undergo extra expense in securing a good crop.

Five years' tests, 1896–1901, of oats at Brandon, show that Banner oats are the most productive—the average yield per acre being 91 bushels.*

At Indian Head, North-West Territories, however, the variety "Abundance" gave a yield of 124 bushels 20 lbs. per acre in 1901.

In both cases the grain matured in 103 days.

The quantity of seed sown per acre is usually two bushels.

(vi.) Cultivation of Barley.

There has been some increase of late years in the quantity of barley produced in the North-West Territories; yet the most considerable element in the local demand has not been met locally. There are six breweries in the North-West Territories, using 100,000 bushels of barley annually, and practically the whole of this is imported from the United States or transported from Ontario. There would seem to be much room for improvement in the selection of seed and the cultivation of the plant in order to produce a quality of barley sufficiently high to secure and supply the local demand for barley for malting purposes. Until a fit barley is produced for the manufacture of the local beers, it seems futile to think of growing barley of a high class for export.

Malting barley is of two sorts and many varieties—the six-rowed sort, which is used for grinding and distilling; and the two-rowed sort for brewing. The highest prices are paid for the latter sort.† Experiments have shown that both sorts can be produced in the Indian Head district.‡ Experiments elsewhere have, however, not yet proved to be successful.

(vii.) Cultivation of Flax.

Flax is another crop as to which the conditions of cultivation seem to be imperfectly understood. It has been grown extensively in Manitoba, especially by the Mennonites, for many years, but exclusively for the purpose of being manufactured into linseed oil. The Manitoba flax seed is for the most part ground at mills in Winnipeg; but the bulk of the relatively small quantity of flax grown in the North-West Territories is sent to Ontario to be treated.

Neither in Manitoba nor in the Territories has flax been grown in quantity for spinning. Indeed, so far as the writer has been able to discover, it has not been grown at all, save in one district. In this district (White Sand River) the Doukhobors have cultivated from Russian flax-seed a small quantity, which has turned out fairly well. The writer saw some linen which had been woven in the colony with yarn spun from flax grown there. The Doukhobors also have their own mills for grinding flax-seed and making linseed oil, which they use in considerable quantities.§

(viii.) Cultivation of Indian Corn.

The centre of production of Indian corn in the United States has moved gradually north-westwards.‖ The area in which corn is successfully ripened seems also to have been extending northwards. Yet so far its successful cultivation has not been achieved in Manitoba or the North-West Territories. Experiments carried out for several years at the Experimental Farms at Brandon and at Indian Head have shown that June frosts prevent the grain from ripening. The varieties used have been those which have been grown successfully in North Dakota, where the conditions approximate most closely to those of the North West of Canada. Although the crop does not fully mature, it is nevertheless valuable for ensilage.

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* Report of Mr. S. A. Bedford, 1901, p. 407.

† Report of Department of Agriculture, Regina, 1904, p. 117.

‡ Report of Mr. Angus Mackay, 1901, pp. 466 and 467.

§ *See* p. 17.

‖ *See* Table I, Reports of Twelfth Census of the United States (1900), Vol. V., Washington, 1902

The use of corn for fodder is extremely important, because by this means only can cattle be properly finished for export. The quantity grown throughout the North West is as yet very small. It does not appear in the statistics of agricultural production.

(ix.) Cultivation of Sugar Beets.

Experiments in the cultivation of sugar beets have been carried on for some years at the experimental farms at Brandon (Manitoba), and at Indian Head (N.W.T.). There can be no doubt about the suitability of much of the soil of these portions of the country for beet culture; but, the crop requires a very great amount of hand labour, and this is a serious drawback in a region where personal service is costly.

The only place where the beet is being cultivated on an extensive scale is in Southern Alberta, at the Mormon Settlement. The system of cultivation is so interwoven with conditions of settlement, and with the development of irrigation, that it has been treated elsewhere.*

(x.) Stock Raising and Dairying.

Cattle Raising.—In the account of the utilisation of the semi-arid area (*see infra*, p. 48 *seq.*) the system of ranching is described, and in the table on p. 44 the number of cattle exported is shown; it remains only to indicate the extent of the herds and the means taken by the Government to cope with infectious diseases among animals. The extent of the herds is shown in the following table:—

Table showing the Numbers of Live Stock in Manitoba and the North-West Territories according to the Census Returns†:—

1901.	Horses.	Neat Cattle.	Sheep.	Swine.
Manitoba	163,367	349,886	29,464	126,459
North-West Territories	176,462	591,739	153,152	73,916
Total	340,329	941,625	182,616	200,375

The Department of Animal Health is under the care of the Chief Veterinary Inspector for the Dominion.‡ A new Animal Contagious Diseases Act was passed (in the Dominion Parliament) in August 1903, and the new regulations came into force soon after. The provincial authorities also have powers under provincial public health Acts to deal with infected animals. This is the case in Manitoba; but in the North-West Territories the subject is wholly in the hands of the Dominion Government, who administer the Act through the North-West Mounted Police. This force has 16 veterinary officers, whose services are at the disposal of the Dominion Veterinary Department.

When cattle are imported into Canada, they are quarantined and tested for tuberculosis after a sufficient length of time has elapsed to make the test effective; some cattle are also tested when exported. Animals which show clinical symptoms are destroyed; but those which react to the tuberculin test are ear-marked in a permanent manner, and are allowed to be removed from quarantine.§ They may not, however, be exported to the United States. The very extensive importation of cattle from the Texas ranges into Southern Alberta during 1903 (amounting to about 24,000 head) led to some anxiety in case some of these cattle might be infected with Texas fever.

The stringency of the regulations respecting the importation of Canadian cattle into Great Britain has been for some time a subject of controversy between the Department of Agriculture in Canada and the departments concerned in Great Britain. It seems, however, fair to say that the Canadian

* *See* p. 53.
† Census of Canada, 1901, Ottawa, 1904, Vol. II., p. 258.
‡ For many years Dr. MacEachran; now Dr. F. G. Rutherford.
§ The extent to which this method is open to objection must be determined by experts in the subject.

cattle industry appears to have accommodated itself to the conditions created by the Diseases of Animals Act, 1896, in reference to the importation of cattle. The adoption of cold storage and of cooled air systems* has made it possible to ship dressed meat to Great Britain with advantage. To these facilities there have also been added cold storage warehouses at the ports and refrigerator cars on the railways.†

There seems no reason to believe that tuberculosis in cattle is worse in Canada than in other countries, even so far as the stall-fed cattle of the eastern provinces are concerned. The available evidence seems, moreover, to show that the cattle on the western ranges are, if not immune, at all events less liable to attack by tuberculosis than stall-fed cattle.

TABLE showing the SHIPMENTS of CATTLE and HORSES from the NORTH-WEST TERRITORIES during the years 1901 to 1903.‡

Province.	Year.	Exports.				Local Shipments.			Total.	
		East.		West.		Stockers to Ranges.	Others.	Horses.		
		Cattle.	Horses.	Cattle.	Horses.				Cattle.	Horses.
East Assiniboia	1901	6,611	73	82	—	4,378	262	18	11,333	91
	1902	9,117	201	305	—	4,300	158	27	13,880	228
	1903	5,959	22	—	—	3,704	24	5	9,687	27
West Assiniboia	1901	9,322	527	227	8	4,148	1,292	900	14,989	1,435
	1902	17,158	868	280	15	2,344	2,824	3,703	22,606	4,586
	1903	6,168	1,458	3	25	3,032	2,671	4,648	11,874	6,131
North Alberta	1901	36	21	1,254	8	1,129	1,083	8	3,502	37
	1902	465	77	1,473	11	740	2,334	96	5,012	184
	1903	1,215	14	923	75	1,100	3,066	326	6,304	415
South Alberta	1901	13,631	3,518	6,627	297	3,046	844	1,655	24,148	5,470
	1902	21,557	3,270	7,505	418	475	4,272	3,874	33,809	7,562
	1903	16,937	3,148	6,447	353	2,908	5,176	6,015	31,468	9,516
Saskatchewan	1901	1,973	—	—	—	1,517	—	—	3,490	—
	1902	2,193	—	—	—	1,092	2,940	—	6,225	—
	1903	1,183	16	—	—	758	146	—	2,087	16
Total for N.W. Territories.	1901	31,573	4,139	8,190	313	14,218	3,481	2,581	57,462	7,033
	1902	50,490	4,416	9,563	444	8,951	12,528	7,700	81,532	12,560
	1903	31,462	4,658	7,373	453	11,502	11,983	10,994	61,420	16,105

Dairying.—Up till about 1890, no organised means of collecting and exporting the products of the dairy existed in the North West; but about that year several creameries were established by private enterprise. Owing, however, to inadequate cold storage accommodation and inadequate facilities for transportation, these enterprises were not successful. In 1897 the Dominion Department of Agriculture established a system, by means of which loans were made to farmers who undertook to organise themselves into Butter and Cheese Manufacturing Associations, and to send their produce to co-operative creameries equipped by means of the loans. The Department undertook to organise the management of these creameries, and to manufacture and sell the butter for a fixed charge of 4 cents (2*d.*) per lb., an additional charge of 1 cent per lb. being made for the amortisation of the loans. The system was established by Professor Robertson, Dominion Dairy Commissioner. The creameries are equipped with cold storage plant, and the Canadian Pacific Railway has provided a refrigerator car service.

The development of mining in British Columbia and in the Yukon afforded a market for dairy produce more readily accessible than the British market, and thus the exports from the North West Territories have been chiefly to that province and to the Yukon. British Columbia alone has been importing from two to three million lbs. of butter yearly from other provinces.§ This demand, however, depends upon the comparatively small

* In 1903, 42 steamers in the Canadian trade had been fitted with cold storage, and 14 steamers with cooled-air apparatus. These steamers made 240 trips in the season of 1903. (Report of Minister of Agriculture, Ottawa, 1904, p. xix.)

† That the "embargo" still causes irritation in Canada is undoubted. See, for example, statement by the Hon. Sydney Fisher, House of Commons Debates (Ottawa), February 2nd, 1905, p. 500.

‡ Annual Report of the Department of Agriculture of the North-West Territories, 1903, Regina, 1904, p. 53.

§ Report of Department of Agriculture, British Columbia, 1903.

agricultural development in that province, and upon the rather unstable prosperity of its mines.

TABLE showing the NUMBERS of CREAMERIES and CHEESE FACTORIES in MANITOBA and the NORTH-WEST TERRITORIES in 1890 and in 1900.*

Province.	1896.		1900.	
	Cheese Factories.	Creameries.	Cheese Factories.	Creameries.
Manitoba - - -	23	8	49	26
North-West Territories -	4	3	2	21
	27	11	51	47

The diversion of the attention of farmers to the growing of wheat, and the increased local demand owing to the increase of population, resulting in the local merchants offering relatively high prices for dairy butter, have contributed to diminish the output of the creameries. In 1903 there were only 18 in operation in the North-West Territories—nine in Northern Alberta, eight in Assiniboia, and one in Saskatchewan.*

In the summer of 1904 the following creameries were in operation in the North-West Territories† :—

Province.	Government.	Private.	Total.
Northern Alberta - -	10	7	17
Assiniboia - - -	11	—	11
Saskatchewan - - -	2	—	2
Total - - -	23	7	30

(xi.) HAIL INSURANCE.

By the Hail Insurance Ordinance which came into operation on January 1st, 1902, the Government of the North-West Territories undertook the administration of a system of hail insurance. Wheat, oats, barley, and flax can be insured against loss by damage from hail, the damage to be appraised by a Government inspector, to the extent of $4 per insured acre. The cost to the farmer is 10 cents per acre insured, but he may be subjected to an additional impost (under an Order in Council) to the extent of an additional 10 cents per acre. The result of this arrangement was a loss to the Provincial Treasury of about $7,000 (£1,400) in the first year of operation. This was found to be too burdensome, and a new ordinance was passed in 1903, extending the provisions to spelts, and imposing an application fee of 50 cents in addition to an increased insurance fee of 15 cents per acre. The indemnity paid to insurers in 1903 was $16,500 (£3,300), and the loss to the Provincial Treasury was $1,700 (£340). The percentage of the total acreage under crops which was insured was, in 1902, 6·1 per cent., and in 1903, 9·9 per cent.‡

In Manitoba hail insurance is left to private enterprise. There are several hail insurance companies, principally with headquarters in the United States, which do business in the province.

(xii.) NOXIOUS WEEDS.

Under the Noxious Weeds Ordinance of 1903, the Territorial Government has established a system of inspection of farms, elevators, threshing machines, &c., and has formed 45 weed inspection districts. Weeds are

* From the Census Returns quoted in the Report of the Minister of Agriculture (Dominion) for the year ended October 31, 1903, Ottawa, 1904.

† Information from Mr. Marker, Dominion Government Creamery Inspector, Calgary.

‡ Report of Department of Agriculture, Regina, 1904, pp. 15 and 16.

destroyed on abandoned land at the cost of the Government. 40 inspectors are employed at a cost of about $4,000 (£800) a year.* New settlers are accused of bringing with them the seeds of noxious weeds; and there have no doubt been some recent importations of European weeds which threaten to become a pest.

(xiii.) Steam Cultivation.

While the prairie farms afford on the whole an excellent field for the adoption of steam cultivation, either on the large farms (1,280 acres to 2,560 acres, or 2 to 4 sections), or on the small farms, by contract ploughing or by co operation, there are certain difficulties which must be met. These are principally the difficulties often encountered in procuring fuel and water. In the flat prairie country, which is especially suitable for steam cultivation, timber is not a natural growth, and is sometimes only obtainable at a distance; coal is available only in certain localities or at a cost for carriage which is sometimes considerable, and water cannot on the higher prairie slopes always be counted upon during the ploughing and cultivating season.

While estimates of cost must always be looked upon with reserve, for reasons which are explained elsewhere,† the following estimates may be given.‡

Cost of horse cultivation :—

		$
Breaking	per acre	3·00
Backsetting	„	2·00
Discing	„	2·00
Harrowing, 4 times at 25 cents	„	1·00
		$8·00

Cost of steam ploughing and horse cultivation :—

		$
Engineer	per day	3·00
Assistant	„	2·00
Ploughman	„	2·00
Oil, &c	„	1·00
Coal	„	7·50
Hire of horses	„	5·00
Interest, wear and tear, and depreciation	„	7·00
Backsetting at $2 per acre, 20 acres	„	40·00
Discing „ „ „	„	40·00
Harrowing 4 times at $1 per acre, 20 acres	„	20·00
		$127·00

The area broken per day ought to be 20 acres. This would give a cost of $6·40 per acre, representing a saving of $1·60 per day, or 20 per cent. less than the cost of horse cultivation.

The cost of the steam plough is about $3,500 (about 700*l.*).

A machine called the Darby digger has lately been introduced into Canada by an English firm, but reports upon its operations are not yet available. The machine is said to prepare land for crops at one operation.§

(xiv.) Agricultural Machinery.

Many agricultural visitors to the North West have noticed with surprise the manner in which the western farmers, as a rule, leave their implements in the fields exposed to the weather, instead of housing them. There are, however, several mitigating circumstances. The dryness of the prairie

* Report of Department of Agriculture, Regina, 1904, p. 33.
† See p. 56.
‡ From Report, Department of Agriculture of the N.W.T., 1903, Regina, 1904, p. 110.
§ *Id.*, p. 111.

atmosphere renders the implements less liable to damage; the relatively high cost of timber in Manitoba and the southern portions of the Territories renders farm buildings expensive, and on a large farm the distance which the implements would have to be drawn is often considerable. There are extensive manufactories of agricultural machinery at Toronto, and at Brantford, Ontario; but large quantities of such machinery are imported from the United States, in spite of the duty.

(xv.) Exhaustion of Soil.

There is a general impression among those who are accustomed to western European conditions of farming that the soil of the North West must be speedily exhausted unless it be enriched by natural or artificial fertilizers. Experience of prairie soils, however, seems to shew that, unless especially exhausting methods of agriculture are employed,* the soil of the prairies does not become exhausted so rapidly as the soil of western Europe. This is due probably, to the inferior rainfall which "scours" the soil to a less extent than is the case in western Europe; and also, no doubt, to the superior evaporation.

In eastern Europe, on the steppe lands of southern and eastern Russia, conditions obtain somewhat similar to those of the American plains, and there cultivation has gone on, in some districts, for very long periods of time without any artificial enrichment of the soil.†

At some period, no doubt distant in respect to the newer soils, artificial enrichment must be resorted to in the plains of the North West. Already there are doubtless instances in which careless farming has resulted in exhausted or weedy land, whose cultivation is more costly than the newer and unspoilt soils. So long as land was cheap, and so long as even "squatting" was common, there was a good deal of migration accompanied by the abandonment of carelessly cultivated lands. Of late years the rise in the value of land has contributed to check this casual movement from one place to another; and has thus contributed to the improvement of cultivation.‡

(xvi.) General Calendar of the Years from 1889 to 1904 in the North West.§

Years.	Manitoba.	North West Territories.
1889	Dry season. Light crops. Roots on farms not thoroughly moistened. Very small yield.	Very mild winter. Sowing in last two weeks of March. Heavy winds in April. Drought all summer. Low yield.
1890	Dry in south-eastern Manitoba. May and June rainfall below average. Abundant rains in July. Rapid growth afterwards. Wet August and September. Late harvest. Fair yield.	Winter long. Heavy June rains, crops damaged. Hot winds in July. Large yield of wheat; inferior quality.
1891	Seeding general in 1st week of April. Warm April. May frost. June rains. Cool July. August rains. Frost in last week of August. Good yield.	Wet: cold and backward spring. Heavy rains. Great growth of straw. Good yield.
1892	Seeding general 14th April. June frosts. Hot August. Yield below average.	Wheat good quality; but low yield.
1893	Very late spring. Seeding May 1st. In July and August dry weather and hot winds. No rust. No frosts. Poor yield.	Late spring. Satisfactory yield.

* Absolutely continuous cropping with the same crop, continuous cropping with exhausting crops, like flax, for instance, or carelessness with regard to the growth of weeds, will, of course, more or less rapidly exhaust any soil.

† The writer is informed by Prince Kropotkin, that on his estates in the Government of Tambov, in southern Russia, the steppe land was cultivated without manure for 80 years. At the end of that time, which was in 1872, the fertility of the land had not been exhausted; but the higher yield from the newer lands of the steppes gave so much larger returns that it was necessary to enrich the older land, in order to raise the rents which had come to bear the proportion of 7 roubles for the old land, and 21 for the new. *See also* p. 35. Compare, however, the statement of Professor Lenz in his Report to the Imperial Commission of Inquiry into Peasant Conditions in 1902: "The Russian farmers are living on their capital; in other words on the fertile elements of the soil . . . . . a system which must sooner or later lead to the exhaustion of the land."

‡ The diminished percentage of cancelled homestead entries shows this. *See* Table on p. 25.

§ The above calendar is compiled chiefly from the Reports of the Superintendents of the Experimental Farms at Brandon, Manitoba (Mr. S. A. Bedford), and at Indian Head, N.W.T. (Mr. Angus Mackay).

Years.	Manitoba.	North-West Territories.
1894	Moderate yield. No early frosts and no hail storms. Low prices. Large exports of cattle.	Variable crops. Good yield in N. and N.W. districts. Eastern Assiniboia, fair; Western, almost total loss.
1895	High yield. Favourable year.	Seeding general in 1st week of April. Heavy rains in June and July. Large crop.
1896	Excessive rainfall in April delayed seeding. Heavy rains in May. Rust attacked wheat in June. Low yield. Rapid growth of trees; and good crops of hay, fruits, and vegetables.	Winter exceptionally fine. Late spring in Assiniboia. Seeding general 13th and 14th April. Large yield. Some rust.
1897	Low temperature and high winds in May and June, very disastrous to oat crops. No injury from autumn frosts. Fair yield.	High winds in April. Spring frosts. Rain storms in June. Harvest variable. In no part complete failure.
1898	Favourable year on the whole. No serious injury from spring frosts. April and May very dry. In June and July frequent showers. Wet harvest. Fair yield.	Backward spring. Heavy snow in April. Loss of cattle. Hot July. Wet harvest. Fair yield.
1899	Unfavourable spring. Abundant rain in June. Low temperature in August; but no injurious frost until after harvest. Good yield.	Very favourable season, although spring late. Heavy rains in May and June. Fair yield.
1900	Unfavourable year. Early frosts. Very small yield.	Unfavourable year. Very small yield.
1901	Mild winter. June frosts. Good rainfall. Large yield.	Successful year. Large yield.
1902	Mild winter. Blizzard, March 14–17. Wheat attacked by Hessian fly. Heavy rains May and June. Floods in the Assiniboine. Perfect weather in harvest. Yield high.	Winter mild and fine. Late spring. Successful year, relatively small yield; but good weather during harvest. Harvest began about August 20.
1903	Good yield.	Good yield.
1904	Floods in the Assiniboine. Good yield.	Some damage by rust. Good yield.

(xvii.) The Utilisation of the Semi-arid Area.

The problem of the utilisation of the semi-arid area has been at least partially solved in two directions:—

1. Stock-raising.
2. Irrigation.

1. *Stock-Raising.*

Until the years 1876–77, buffalo in vast numbers grazed upon the semi-arid plains; great herds roamed east and west and north and south. The sudden disappearance of the buffalo in these years has never been quite satisfactorily accounted for. The occurrence of considerable areas on the prairies covered with buffalo bones* suggests that great numbers perished together, either overwhelmed by blizzards or overcome by some epidemic.

Although wholesale slaughter by the hunters of the period had undoubtedly thinned the great herds and prevented them from recovering from these disasters, the two causes mentioned were, in all probability, important factors in their disappearance.

(*a.*) *Cattle.*—The fact that the plains of the semi-arid area and the foot hills of the mountains on its margin had been the home of the buffalo, suggested that the area might be utilised for the grazing and breeding of cattle and horses on the open plains. The similar area in Montana had already for some years been used in this manner, when in 1881 an exploring party† went into Southern Alberta by the then best available route through Montana for the purpose of determining whether or not the district was suitable for the raising of stock. This exploring party found that there was abundance of

* Even so late as 1896, there were many such areas in Southern Alberta; and in 1904, the writer saw on the prairie about 20 miles from Fort Pitt, on the North Saskatchewan, a place in which many hundreds of animals must have perished at one time.

† McEachran, Duncan, Chief Inspector of Stock for Canada. "The Live Stock Industry of Canada" in the Handbook of Canada, Toronto, 1897, p. 374.

"bunch" grass (*Eriocoma cuspidata*) and of other wild grasses, and that adequate protection was afforded in the foot-hills. The result of this exploration was the establishment of the first ranche (the Cochrane ranche) for stock raising. Other ranches were established in subsequent years; grazing rights were obtained from the Government; large herds, in the first instance, of Montana cattle and later of thoroughbred stock, principally Herefords, were accumulated. Herefords afterwards (about 1898) gave place to shorthorn (Durham) cattle, which now form the bulk of the stock on the ranges.

In some cases the ranching companies purchased land outright from the Government, or in the case of railway lands, from the companies to whom it belonged; in other cases they simply rented the grazing at the nominal rent of one cent. per acre per annum. In the first case the ranchmen were secure so far as their purchased land was concerned from the invasion of settlers. In the other case there was no such immunity, and settlements began to be formed gradually, and to a small extent, within the ranching region. In the first instance, these settlements were formed chiefly by "squatters," who simply built houses and cultivated the land about them.

Although there are conspicuous examples to the contrary, it may be held that ranching was, on the whole, successful. Many errors in management were made, and much loss was incurred in individual cases. At the beginning under-estimates were formed of the amount of capital which must inevitably be invested, and exaggerated anticipations were made of the possible profits. It was found, however, in the main, that the open prairie was extremely suitable for raising both cattle and horses, provided proper selection of the class of cattle was made; and that the relative dryness of the air and of the soil contributed, through the nutritive character of the grasses grown under these conditions, to produce beef of a firmer and better quality than was possible in moister regions. Indeed, the dry years were found, on the whole, to be the best years for cattle. The percentage of losses from all causes was low, and altogether the industry was a profitable one.

Partly owing to the occurrence of wet seasons, and partly owing to the pressure upon the Department of the Interior by settlers anxious to take up land, the conditions in the western portion of the semi-arid area have altogether altered during the past eight years. The succession of moist years had rendered the cattle industry less profitable, although the demand from the mining regions of British Columbia became from 1896 an important factor; at the same time this succession of wet years constituted an inducement to the settler, who up till then had avoided the district on account of its reputed tendency to drought, and the demand for agricultural produce in general from the new mining regions offered a ready market for the produce of the small farmer. These circumstances conspired to cause the Department of the Interior to throw the district open for settlement, and thus altogether to alter its character.

This decision was not arrived at without vigorous opposition on the part of the ranchmen. They represented that the region was not suitable for settlement, while many other tracts of country were; that it was essentially a ranching country, and not a country for small farming, and that if they were driven away by the invasion of the settler, they had no other place to go to.

There was, on the other hand, the obvious retort that the ranchmen were few in number, while the prospective settlers were many, and that the exclusive retention of a vast area for which only a nominal rent was paid by the ranchmen, was unfair in the general interest.

Some of the ranchmen bought the lands they had leased, or a portion of them, some removed farther into the foot hills, most of them reduced their herds. It came to be felt that the day of the large ranche was over, although there are still some large ranches, and there are still some ranchmen who believe that the old conditions may one day return.

Thus, for the time at all events, the unrestricted grazing of herds belonging to many different ranching companies, over thousands of square miles of prairie, with spring and autumn "round-ups," one for the branding of the calves, and the other for the selection of the stock for shipment, belongs to the past.

The great ranches are fenced in, and the remainder of the country has been opened for settlement.*

These observations apply to the older ranching-lands of Southern Alberta. There is still some cattle and horse ranching in Southern Assiniboia, and during the few past years ranchmen have established themselves in the unsettled country lying between the Red Deer River (a tributary of the South Saskatchewan) and the Battle River, a tributary of the North Saskatchewan. These districts are both within the semi-arid area. The first district, of which the Cypress Hills may be regarded as the centre, may probably continue indefinitely as a ranching region. The second district may, ere long, be invaded by the settler, although as yet it is not traversed by any railways.

(*b.*) *Horses.*—For some years prior to 1896, herds of horses, largely of Clydesdale stock, were kept on the open ranges in Alberta; but in that year some of the ranchmen who had been engaged in the business exported their herds and transferred their attention to cattle. This proved to be an unfortunate step, because the demand for horses for the British Columbia mining regions became considerable in the following year, and in 1899 a very large demand, which the North West was quite unable to meet, developed for the South African campaign. For this reason, and on account of the increase of immigration and of railway construction, the demand for horses continued, and prices advanced during the following years. The continuance of demand for British Columbia has encouraged ranchmen anew to keep and breed horses; and the production has steadily increased. It is, however, no longer the practice to permit the herds to roam at will over the plains, and more care in breeding is taken than was formerly the case.

(*c.*) *Sheep.*—While the prairie grasses are as a rule suitable for the grazing of sheep, and while the relative dryness of the semi-arid region is favourable to the maintenance of flocks, sheep farmers have encountered many difficulties. These may be catalogued as follows:—Ravages of prairie wolves (or coyotes); prevalence of premature lambing, due probably to the presence of ergot among the prairie grasses; and storms. To these drawbacks must be added the extremely low price which prevailed for some time in all wool markets. These causes have not only prevented farmers from adding to their flocks, but have contributed to the deterioration of these, owing to in-breeding, and have prevented farmers from going into the business. Nevertheless, there are said to be about 150,000 sheep west of Medicine Hat. The breeds are principally Cotswolds and Merinos.

2. *Irrigation.*

The irrigation of the eastern portion of the semi-arid region presents grave difficulties. Only one river of consequence flows through the district, viz., the Qu'Appelle River. This river flows through a valley, deep almost throughout its course and wide at intervals, but with very little fall. For this reason it is impossible to regard irrigation from it as within practicable limits.† Thus a large part of the semi-arid region may be regarded as beyond the possibility of irrigation. The western portion of the region presents, however, different features. Although the general level of the prairie is higher in the west than in the east, the proximity of the Rocky Mountains, from whose slopes many torrential streams descend, renders it comparatively easy to tap these streams at high levels near their sources and by obtaining a total fall of many hundred feet to succeed in distributing their waters, or a portion of them, over the lower levels.

Irrigation has been carried out upon a considerable scale in two important districts, the Calgary District and the Lethbridge District, the second being about a hundred miles to the south of the first. Over five

* *See* p. 52.

† It was suggested by Professor Hind, in 1859, that the waters of the South Saskatchewan might be used for the purpose; but this would probably involve a canal of a length which even the present development of the country would hardly justify. "General Report on Irrigation," Ottawa, 1895, p. 6.

hundred miles of ditches are now in operation in these districts, and nearly a million acres are susceptible of irrigation from them.

Experience, alike in the arid region of the United States and in the semi-arid region of Canada, has shown the necessity of providing for a series of dry years. South-Western Nebraska was settled three times, the two first groups of settlers having abandoned their holdings because of continued drought. In Eastern Assiniboia the first settlers also abandoned their holdings, to be followed by a second group when the series of moist seasons came. In 1894 the Government of the North-West Territories expended 8,000*l.* ($40,000) in relief of settlers ruined by the failure of crops in consequence of drought. Notwithstanding these incidents, it must be stated that some highly intelligent farmers succeeded in making ends meet even in the poorest years.

Unless there is some general and practical means of saving the crops from the effects of deficient rainfall, people are apt to become discouraged although they may be unwilling to pay the premium of insurance against loss. Experience in the United States goes to show that moist land is less liable to be affected by summer frosts than dry land. This of itself is an important advantage.*

The investment of capital in irrigation must necessarily be slow, because irrigation is, after all, necessary only at irregular intervals. During wet seasons farmers do not need it, and they are naturally reluctant to pay for the cost of maintaining it until it is required. Irrigation is a business requiring very large capital, and much tact in dealing with the population upon an irrigated area. It is easy for the farmers to acquire the notion that the irrigation company is taxing them too heavily. Spontaneous co-operative irrigation, if based upon limited experience, would almost inevitably be deficient if it were called upon during a dry season, because of the difficulty of convincing the people most seriously concerned of the existence of a cycle involving the recurrence of a series of dry years.†

(*a.*) *Irrigation in the Calgary District.* — The first experiment in irrigation in this district was made in 1879, when a small ditch was constructed by a ranchman. A number of other small ditches followed; but they were all experimental, some of them were faulty in construction and none of them were conspicuously successful. The wet year (1884) probably influenced opinion upon the need for irrigation, for no ditches were constructed for some years afterwards. The occurrence subsequently of a series of dry years, and the unremitting energy and advocacy of Mr. William Pearce, then Dominion Superintendent of Mines, whose headquarters were at Calgary, excited public attention from about 1891, and a number of irrigation companies were formed, while several ranchmen constructed ditches of some magnitude for the purpose of irrigating hay lands—bromus and alfalfa grasses being principally grown. These grasses attained enormous size, and the advantage of irrigation for their growth for ensilage purposes became very evident. By 1894 some 270 miles of ditches had been constructed.‡ Again, wet years supervened, and it appeared as if the only use of the irrigation ditches was to drain off superfluous water, indeed some of the irrigation works were almost irretrievably damaged by floods.

The Canadian Pacific Railway Company had obtained as part of its land grant from the Dominion Government 3,000,000 acres in the semi-arid area.§ It was obvious that this land could not be confidently exposed for

* "General Report on Irrigation, 1902," Ottawa, 1903, p. 65.

† The law of water rights in the Canadian North West is contained in 57 & 58 Vict. c. 30, amended by 58 & 59 Vict. c. 33, further amended and consolidated by 61 Vict. c. 35; and in the North West Irrigation District Ordinance. The laws of Canada and those of the States in the arid region of the United States in respect to irrigation may be compared by consulting "Irrigation Laws of the North-West Territories of Canada and of Wyoming," Washington, 1901. Much useful information on irrigation practice and results is to be found in the Annual Reports of Irrigation Investigations, United States Department of Agriculture, Washington.

‡ A list of these is to be found in General Report on Irrigation and Irrigation Surveys, 1894, Ottawa, 1895, p. 20, *et seq.*

§ This land was taken after the area of the various land grants had been exhausted so far as concerned the land which was considered to be suitable for settlement without irrigation.

sale to settlers, and could not, even if it were sold, be expected to be profitable to them or to the railway company in the long run, without irrigation. After arranging with the Government to get their land in contiguous blocks, so that one large plan of irrigation might be devised, the Canadian Pacific Railway Company decided to adopt what is by far the most extensive scheme of irrigation in the North West, and is one of the most extensive schemes to be found anywhere.

Under the advice of Mr. J. S. Dennis, who had formerly been in charge of the Dominion Irrigation Surveys, and who now became assistant to Mr. Whyte, third vice-president of the Company, it was decided to construct a canal from the Bow River at Calgary. The construction of this canal has begun, and in the course of the year 1905 water will begin to be supplied to some of the area in question.

The works under construction at present will provide a canal 60 feet wide and 5 feet deep, which, with its subsidiary ditches, will provide for the irrigation of about 150,000 acres. As these lands pass into cultivation, additional works will be constructed until at least 60 per cent. of the total area of 3,000,000 acres is irrigated. The intake from the Bow River at Calgary is at an elevation of 3,400 feet, and the elevation of Medicine Hat, towards which the area in question extends, is 2,171 feet. There is thus an ample fall for distribution purposes. The fall will not be quite uniform, but will be about 2 feet per mile.

(*b.*) *Irrigation in Southern Alberta.*—The railway line of the Alberta Railway and Coal Company connects the coal-mining town of Lethbridge with the copper-smelting centres, Great Falls, Helena, and Butte in Montana (U.S.A.). In order to facilitate the construction of this line and of the line (now a portion of the Canadian Pacific Railway) between Lethbridge and Dunmore (on the main line of that railway) a grant of 220,000 acres of land was made by the Government.* This land was situated in the semi-arid region and was utilised solely for pasture.

In 1895 the irrigation surveys of the Dominion Government made it plain that the region was susceptible of irrigation, and that the nature of the soil and the conditions of the climate other than those of rainfall were such that certain branches of agriculture might be carried on with profit, provided a supply of water was made available.

The Canadian North-West Irrigation Company was formed for the purpose of constructing the necessary works and administrating the supply of water. This company began operations in 1898, and the irrigation system as at first designed was completed in December 1900. The capital of the company was subscribed in England, the total expenditure up till that date being about 200,000*l.* A second irrigation system is now in course of construction by the same company.

The water supply of the first system is obtained from the St. Mary River, which has its source in the St. Mary Lakes on the eastern slope of the Rocky Mountains in the State of Montana, a short distance to the south of the International Boundary.

The irrigable region consists of a plateau with a general elevation of 3,000 feet above sea level and from 200 to 300 feet above the St. Mary River, which pursues a tortuous course on its western margin. The intake is situated about five miles north of the International Boundary, at an elevation of 3,854 feet above sea level.†

The main canal is 40 miles in length and is designed to carry 500 cubic feet of water per second, the fall per mile being 2 feet.

Numerous subsidiary branches distribute the water over the area served by this system, which was originally intended to provide irrigation for about

* Under 52 Vict. c. 4 and 53 Vict. c. 3.

† Department of the Interior, General Report on Irrigation and Irrigation Surveys, 1895, Ottawa, 1896, p. 50.

71,500 acres;* extensions have, however, been made until now the area to be served is considerably more than 300,000 acres.

The second system is designed to take its water supply from the Milk River which has its source and also has its outlet in the United States.

This system is intended to supply the region lying north and east of the Milk River Ridge, and to connect with and supplement the first system as above described.

The occurrence of a succession of moist seasons,† and the construction of these extensive works to insure against the consequences of a deficiency of rainfall in the dry years that may come, have together contributed to inspire a large number of people with confidence in the country. Its proximity to the markets of British Columbia and its mild and healthy climate contributed also to induce the considerable immigration of the past few years.

Nearly all of the immigration thus induced has taken place from the United States, principally from the following: Utah, Montana, Idaho, Arizona, Wyoming, Colorado, Oregon, Nevada, and New Mexico, all situated in the arid region, and Washington, which, though on the western slope of the mountains, suffers from periodical deficiency of rainfall. The immigrants are thus accustomed to the cultivation of dry soils‡ and to the use of irrigation.

3. *Mixed Farming and Sugar Beet Cultivation in the Semi-Arid Area.*

The most important, and by far the most cohesive, groups of settlers in Southern Alberta are those of the Mormons. Their first settlement at Cardston has already been noticed.§

On the completion of the first irrigation system of the Canadian North-West Irrigation Company, a new migration of Mormons from Utah began. In May 1899 they founded the small town of Stirling on the Alberta Railway and Coal Company's line, and in September 1901 they founded the now important town of Raymond on the Spring Coulee Branch of the same line. The town of Magrath on the same branch was also founded in 1899.

This migration has been organised by the Knight Sugar Company. This company, composed wholly of Mormons, and provided with capital contributed by them, secured 260,000 acres of land in the irrigable area already indicated.

The principal object of this company is the cultivation of the sugar beet and the manufacture of sugar. In order that beets may be cultivated successfully an amount of labour is necessary, relatively large when compared with that required for other crops. The beets must be constantly cultivated and kept free from weeds. The domestic habits of the Mormons render beet-growing a congenial occupation; because owing to the high cultivation necessary the individual lots need not be large, and need not therefore be at any great distance from their homes. These must, from their habits, be clustered together in towns or villages. The system adopted is to fence in an enclosure of several thousand acres, to divide this enclosure into lots of 40 acres each, and for each settler to pay to the company a fixed price for the land and a fixed price for his share of the advantage of the common fence. On this land he may cultivate anything he pleases; but inducements are offered to the cultivation of beets. These inducements consist in a ready market for this produce in the sugar factory which has been established at Raymond. In addition to the land cultivated in this semi-cooperative way, the Knight Sugar Company have 3,000 acres of beet lands which they cultivate partly by means of the labour of Chinese. The Company has entered into a contract with a Chinese firm in Victoria, British Columbia, to supply 100 coolies during three years from 1902.‖

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* Department of the Interior, General Report on Irrigation and Irrigation Surveys, 1895, Ottawa, 1896, p. 53.

† *See* pp. 8 *et seq.*

‡ Some of these new settlers have established themselves even on the higher lands where they are beyond the reach of any practicable irrigation system. It can hardly be doubted that such settlements must be abandoned should a long succession of dry seasons supervene.

§ *See* p. 13.

‖ The Poll Tax levied on Chinese on their entry into the country having been raised from $100 to $500, the continuous supply of Chinese labour is problematical.

Each of these coolies receives from the Company ten acres of land for which he pays rent at the rate of one dollar per acre. The Company supplies the seed, and the ploughing and harrowing is done for it by Mormon labourers. The coolies keep the beets free from weeds, direct the water from the branch ditches, and ultimately deliver the beets to the factory at Raymond. The amount of saccharine being determined by the Company's chemists, the coolies are paid at a rate per ton of beets in accordance with the analysis. The coolies live in small wooden houses covered with black tarred paper on or near to the land they have in cultivation.

On the beet lands cultivated by the Mormons, the women and children of the Mormon families are employed in weeding and in attending to the irrigation. It is intended to substitute Mormon for coolie labour, as soon as a sufficient supply is available.

The capacity of the factory is 400 tons of beets per day. Since its establishment in 1902, it has been able to obtain beets sufficient to keep it going for only some 160 days per year.

The factory is equipped with the most modern machinery. There is no difficulty about the disposal of its production.

The earnings per acre for beet cultivation vary from $30 to $75 per acre according to the state of cultivation of the land. There can be no doubt of the suitability of the region for the growing of sugar beets.

The Mormon farmers have in some cases considerable herds of cattle which are tended by herdsmen on the plains at a distance from the settlements. These herdsmen live in hooded Mormon wagons comfortably fitted up, and, as a rule, stocked with a supply of books. The young Mormons seem to enjoy the freedom which such a mode of life involves. On the land in the neighbourhood of the settlements, the Mormon farmers grow large quantities of root crops under irrigation.

4. *Wheat Cultivation in the Semi-arid Area.*

In the semi-arid area practically no spring wheat is sown. Cultivation is almost entirely devoted to fall wheat. The variety principally used is Turkey Red and the quality is, as a rule, very fine. A large farmer (farming 1,280 acres in the High River district between Calgary and McLeod and possessing another farm in the Spring Coulee district) entertains the opinion that wheat can be grown in these districts, even in dry years, without irrigation, Nevertheless an irrigation system gives a sense of security in view of the probable approach of a dry period. Moreover, in wet seasons the irrigation ditches act as drains. This farmer is of opinion that the failure of the earlier settlers in the semi-arid region was due to shallow ploughing. He advocates deep furrows, at least 5 inches instead of 4 inches. He thinks that cultivation does mitigate locally the effect of frost; but he does not think that cultivation has affected the climate of the plains as a whole.

In 1903, fall wheat appeared for the first time in the statistics of agricultural production in the North-West Territories, 71,532 bushels being produced on 2,754 acres, a yield of 25·97 bushels per acre in the Lethbridge, McLeod, and Pincher Creek districts (District No. 16 on map†); and 2,621 bushels on 112 acres, yielding 23·40 bushels per acre in Calgary district, (No. 15 on map†).

The advantage of fall over spring wheat in these districts lies in the circumstance that the former matures from two to three weeks earlier than the latter. It thus escapes the September frosts that have been so injurious to spring wheat.

(xviii.) Value of Land in the North-West.

According to the Census returns the mean value of lands held in lots of over five acres in Manitoba, is. $10·53 (2*l.* 3*s.* 4*d.*)* per acre; and in the North-West Territories, $5·48 (1*l.* 2*s.* 7*d.*) per acre.

* £1 = $4·866. † *See* Map III. at end of volume.

TABLE showing, from the CENSUS RETURNS, 1901, the VALUATION of LAND in MANITOBA and the NORTH-WEST TERRITORIES.*

	Manitoba.		North-West Territories.	
	Acres.	Valuation.	Acres.	Valuation.
		Dollars.		Dollars.
Land occupied :—				
In lots of 5 acres and over	8,842,359	93,217,823	6,568,803	36,032,762
In lots under 5 acres	988	15,712	261	3,815
Buildings	—	20,040,036†	—	8,762,909†
		9,600‡		3,875‡
Farm implements	—	11,997,777†	—	6,013,553†
		171,842‡		48,103‡
Rent of land and buildings leased.	—	514,488†	—	156,847†
		179‡		45‡

These valuations, which represent means of $10 and $5 per acre may be accepted as representing, for Manitoba and the North-West Territories respectively, fair average values for the year 1901.

At that time, however, there were considerable areas of land which were just being brought into cultivation by the immigration in numbers during the preceding three or four years. This land was as yet of no great value, such of it as was homesteaded being worth little more than any burdens which might have been placed upon it by the homesteader.§ On the other hand there was a good deal of improved land, and especially land near the railway lines, which had been occupied for some years, and the owners of which were willing to sell out in order that they might buy cheaper lands elsewhere in the Territories, or even that they might take a second homestead, which they were permitted to do under certain conditions. These lands were, as a rule, not to be had, for several years prior to 1901, at much less than $15 per acre in Manitoba. Such lands, since 1901, have very considerably increased in value, owing to the incoming of a new immigrant population, with a high average of purchasing power. It would be hazardous to say what this increase in value amounts to; but the writer is aware of cases in which land, not worth more than $5 per acre in 1896, nor worth more than $10 per acre in 1899, has been sold to settlers from the United States for $25—$27·50 per acre, in 1904. It must be observed, that all of this is, by no means, "unearned increment." A large portion of the increase has been gained by years of expenditure in improvements. The only cases in which unearned increment has accrued are those in which unoccupied lands adjoining occupied lands have been held either because, with a plethora of land in the market the owners could not get rid of them, or because they were definitively held for a rise in price. The general experience of the North West, there being, no doubt, a few exceptions, is, that it has not paid to hold land unoccupied for a long series of years. The rate of interest for liquid funds has been so high, that, for land to yield, in increased price, the equivalent of the market rate for money, it would be necessary for it to be doubled in value in a very short period.

In the North-West Territories there are certain arbitrary prices, which, to some extent, form a guide. The Hudson's Bay Company's minimum price, which was $5 per acre a few years ago with relatively few sales, with many sales is now $6. The Canadian Pacific Railway Land Grants which, in 1896, were sold at about $3·50 per acre, are now sold at about $4 per acre;‖ although there is still land to be had in certain portions of those Grants at about $3 per acre.¶ In the Territories, it may be said generally, that land in large blocks cannot now be had for less than $6 per acre within reasonable distance of a railway line, and that, for good land in small blocks, similarly situated, up to $10 at least would have to be paid. A homestead of 160 acres is, under these conditions, a real endowment; and an immigrant with three grown-up sons, who secures altogether a whole section, or

* Bulletins XIV. and XV. † For lots of over 5 acres. ‡ For lots of under 5 acres.
§ *See* p. 78. ‖ *See also* Table on p. 94.
¶ On the Calgary and Edmonton line for example.

640 acres in homestead land, has a very solid economic foundation, if he is able to build upon it.

There is a good deal of quasi-renting in the Brandon district, and probably also in other parts of Manitoba. For example, a speculator may buy school lands from the Government, and may employ a young farmer to "break" the land, *i.e.*, to bring it into cultivation, on condition that the proceeds of one-half of the crop are devoted to the payment for the land. An active young man may thus acquire good land on terms of payment which depend upon his ability to pay. The price being fixed, a succession of a few good years would enable him to pay it in instalments. On the other hand, should crops be deficient, a longer period must elapse before these instalments are all paid. He is not, however, obliged to pay each year any definite pecuniary amount.

The rush of settlers on the one hand, and on the other, the artifices of the Colonisation Companies which have been formed within the few past years, have contributed to advances in the price of lands in some districts which are probably not wholly warranted by the conditions. Fear of a possible succession of dry years and of consequent losses to the recently established settlers has induced the loan companies to impose a certain limit to these advances by refusing, in many cases, to lend more than a moiety of the cost of the land.

(xix.) Labour in Manitoba and the North-West Territories.

The ease with which an agricultural labourer can establish himself as a quasi-independent or independent proprietor and cultivator, and the relatively large area of land which he can acquire at the mere cost of registration,* render it difficult for employers to obtain personal service at other than a relatively high cost. The newly arrived immigrant who comes without any funds, and with a wife and children, is no doubt willing and anxious to take immediate employment; while the established settlers, who have acquired more land than their own labour and that of their families suffice to cultivate, are equally anxious to secure labourers. It will, however, depend upon the character of the cultivation whether these labourers are required for a long or for a short period. If the farmer engages in mixed farming on an extensive scale, or if he confines himself to stock-raising, he will require to employ labourers practically all the year round; but if he specializes in crops, he will only require them at certain periods for a few weeks at a time, or at most from the spring until the fall. For this intermittent labour the fresh immigrant is sometimes available, and the sons of homesteaders whose services are not required on their fathers' farms may take employment in this way. The practice of the migration of harvesters from Eastern Canada to the North West has also supplied the labour market to a certain extent.†

In spite of the considerable immigration of the past few years, it would appear that the difficulty of obtaining efficient labour has not been diminishing. The efficient labourer can establish himself independently with so little capital, and he can so readily obtain credit, that he is little inclined to submit himself either to servitude or to intermittent employment. The consequence is that the farmer who must employ labourers is compelled to employ the less efficient, and to pay relatively high wages, because even these are not in all districts relatively numerous.

The construction of railways in many different parts of the country has also drawn off the supply from the farm labour market. The relative freedom and the relatively high wages constitute together an inducement irresistible to men who look forward to a speedy accumulation of capital sufficient to establish themselves on land of their own.

For these reasons it would appear either that the dominant factor in North-West farming must be the mere homesteader, non-labour-employing

* *Cf.* System of Survey and Homesteading, *supra*, p. 23.

† The details of the districts in Manitoba, into which these harvesters have gone temporarily, and the numbers, are given in the annual reports of the Department of Agriculture of Manitoba. The Department assists the farmers to obtain the amount of labour necessary to get in their crops by acting as a kind of employment agency through their offices in Toronto and elsewhere.

farmer or peasant proprietor; or that, alternatively, the labour-employing farmer must abandon intermittent employment, and must provide employment and accommodation for his labourers all the year round. In order to do this, it may be necessary for him to change his system of farming; and instead of specializing in crops which require only intermittent labour, to embark in mixed farming to a much greater extent than heretofore.

It is true that the organization of harvesting and even of ploughing companies, by means of which peripatetic groups may do farm work by contract, might mitigate the effect of scarcity of skilled farm labour under present conditions. It may be pointed out, however, that the farmer might find the greater part of his farming profits absorbed by such agencies, and in any case these companies could only be organized on a profitable basis in well-developed agricultural districts.

It should be observed, of course, that the increase of population may of itself alter these conditions considerably; but the increase of population brings about the development of industries, and these constitute a powerful attraction to draw the younger farming generation from the isolation of the farm to the town.

The conditions of farm labour vary very much in different districts; and the rates of wages vary also alike with the district, and seriously with the individual labourer. The new immigrant unaccustomed to farm labour receives little more than his board and lodging.

The sturdy peasant from Eastern Europe usually demands and obtains comparatively high wages. For example, in the district of Brandon, Manitoba, an important wheat-growing region, wages varied very much in the season of 1904. Newly arrived immigrants who had "little, if any, knowledge of farming," received \$10 (2*l.*) to \$15 (3*l.*) per month with board and lodging, while experienced farm hands were paid \$20 (4*l.*) to \$35 (7*l.* 7*s.*) per month with board and lodging.*

In the district of Indian Head, Assiniboia, the following were the rates of wages paid in 1904. First-class experienced farm labourers \$30 (6*l.* 6*s.*) per month for eight months; ordinarily good men \$25 (5*l.* 5*s.*) to \$26 (5*l.* 9*s.*) per month; inferior hands \$15 (3*l.* 3*s.*) to \$20 (4*l.* 4*s.*) per month, board included. For harvest and threshing alone \$40 (8*l.* 8*s.*) to \$50 (10*l.* 10*s.*) per month. A a rule a farmer in this district hires one or more men for eight months from 1st April.†

In out-of-the-way districts, where comparatively few labourers are wanted, newly arrived and inexperienced immigrants, who are from the farmer's point of view worth little more than their board, are employed for short periods at wages lower than \$10 per month with board and lodging.

In Manitoba the rate of wages during the past few years for labourers employed for the harvest only is \$35 to \$45 per month with board and lodging.‡

The Department of Agriculture of Manitoba estimates the proportion of harvest hands who remained in the province at 50 per cent. of the annual invasion during some years prior to 1904. In that year the number is estimated at 33 per cent. This falling off in the proportion remaining is alleged to be due to the circumstance that "a larger number than usual of "those who came from Ontario were not from the farm, but were young "men from towns and villages who had been engaged in offices and various "business occupations, and who came with a desire to see the country and "learn something of its possibilities."‡ It occurs sometimes that farm labourers who go to Manitoba from the Eastern Provinces for the harvest, and return after the harvest is over, find their way back to Manitoba for permanent settlement in subsequent years.‡

* Information from Mr. S. A. Bedford, Experimental Farm for Manitoba, Brandon.

† Information from Mr. Angus Mackay, Experimental Farm, Indian Head, North-West Territories.

‡ Information from Mr. W. I. Black, Deputy Minister of Agriculture, Winnipeg.

Wages of men working as navvies on railway construction works are from $1·50 to $1·75 (6*s.* 3*d.* to 7*s.* 3*d.*) per day. This work is extensively done by Galicians and Doukhobors. Farm labour and railway construction work is also irregularly and spasmodically performed by restless men who move about the country, sometimes travelling immense distances; but this source of supply is not as a rule considerable. Such labour is also often performed as a makeshift by students in training for professions, who realise a sufficient sum from manual labour during the summer to defray their expenses in the colleges at Winnipeg or elsewhere in the winter.

(xx.) Cost of Producing Wheat.

Individual statements are made from time to time of the cost of producing wheat, but no serious inquiry has been made into the subject in the Canadian North West. The difficulties of such an inquiry would necessarily be very great. Farmers do not always keep accurate accounts, and, even if they did, many items in the cost of wheat production must be subject to speculative estimate.

The following may be regarded as comprising a list of the details which it would be essential to know in order to form any serious estimate of the cost.

*Rent.**—This would be a very difficult matter to estimate, excepting in certain parts of Manitoba, where the practice of renting land is to be found. Even there, however, it is customary to rent land on shares of the produce. If the pecuniary value of the share were taken to represent the rent, an element of confusion would be introduced. So long as land is to be obtained on homestead terms, the value of adjoining land, already in private ownership, must be merely arbitrary, and an estimate of rent based upon this must be arbitrary also.

Interest on Farming Capital.—This item would also be difficult to determine, and wide divergences in the same district might be expected to occur.

Insurance.—In most individual calculations this item is either omitted, or is entered only when a premium of insurance is paid by the farmer to someone else. Clearly, however, for what risks the farmer runs, fire, hail, flood, or drought, he must either insure or charge his accounts with the cost to himself of carrying the risk.

Wages.—The item of wages is, perhaps, more easily to be dealt with than the preceding, although even where the farmer takes into account the amount he pays in wages during the ploughing and threshing seasons, together with his own wages calculated upon those of others for these seasons, he does not usually add his wages of superintendence. These, of course, depend partly on complementary products other than wheat. They go on the whole year, and they must, therefore, be difficult in any case to determine. The items of labour for which wages would fall to be paid are chiefly these: ploughing, sowing, cutting and binding, heading and stacking, shocking, threshing, storing, marketing.

Materials.—The cost of materials, especially seed, together with the fodder for horses or oxen, used in the above operations, must also be taken into account, and allowance must be made for the wear and tear of agricultural implements and animals gradually used up in these processes.

If all of these items were summed up, they would give, in a particular case, the cost of cultivation, and from that cost, which could be worked out at a cost per acre, the cost per bushel might be ascertained *when the yield came to be known.*

* There is a well known theoretical objection to the inclusion of rent as an element in the cost of production, but most estimates of the cost of wheat include it, and the difficulties of determining it have, therefore, been stated.

The United States Statistical Department have made attempts to discover the cost of wheat production in all the States, but it does not appear that prior to 1894 any individual State made investigation on its own account. Since the State of North Dakota occupies a position comparable in many ways with Manitoba, it may be useful to indicate briefly the result of an investigation made by that State in 1894. The investigation covered the three preceding years 1891 to 1893. So far as the inquiries went, it appeared that the cost of production per bushel (including rent and wages somewhat as above defined), some, but not all, insurance and seed, but making no allowance for interest on farming capital or for the replacement of agricultural machinery or animals, was as follows:—*

1891.	1892.	1893.
$0·365	$0·471	$0·581 per bushel.

These figures are the averages of the total number of cases taken from different parts of the State.

While thus the total production cost apparently rose steadily during the three years, the rise is to be accounted for partly by diminished yield, and partly by increased allowance for rent; the labour costs on the whole diminishing. According to this inquiry the following was profit and loss during the same years:—

1891. Profit.	1892. Profit.	1893. Loss.
$·4170	$·1214	$·437 per bushel.

The yield of wheat in the cases inquired into was as follows:—

1891.	1892.	1893.
26·34	17·59	12·70 bushels per acre.

While it would no doubt be important to have similar statistics for Manitoba for purposes of comparison of the cost of production of wheat in that province as compared with other countries, it would, even, all, be more important for the Manitoba farmer to be in a position to estimate clearly the relative cost of production of wheat in relation to other farming products on his own farm. Probably he is already in a position to do this in a rough and ready fashion, although the results of a careful statistical inquiry might be helpful to him. The question of external comparisons is a much more difficult and complicated problem.

It may, perhaps, be sufficient for practical purposes to state that when the price of wheat at the elevator immediately after threshing is about 50 cents per bushel (about 16*s.* 8*d.* per quarter) the farmer, provided he has a fair yield, is probably obtaining enough to cover his actual costs plus a small amount for land and improvements (rent), and profit (wages of superintendence).† When wheat falls below this, or when he has a deficient crop, it seems likely that he will lose; when it rises above that price, he will probably gain nearly all the increase.

It is impossible at present to state what is the average profit per acre of wheat production in the North West.

Even if statistical information were forthcoming which would indicate the profit upon wheat sold by the farmer immediately after threshing, there would still remain the question—How much does the farmer lose or gain by speculating in his own wheat, that is, by holding it over for an advance in the market?‡

* Third Biennial Report of the Commissioner of Agriculture and Labour to the Governor of North Dakota, Jamestown, N.D., 1904.

† It is customary in the North West to regard the cost of producing as amounting to 65 per cent. of the price at the elevator; but this is clearly a very casual method of estimation.

‡ *See* pp. 90 and 102.

(xxi.) Statistics of Agricultural Production.

In forming conclusions upon the agricultural production of the North West, regard must be had to the fact that the period over which statistics of any kind have been collected is very limited. As regards Manitoba, statistics have been collected from 1883 until the present time, with the exception of the year 1888, when no statistics were collected. It is difficult to represent the development of the different statistical districts in Manitoba; because the division of the area into districts was changed several times between 1883 and 1892. In the North-West Territories, the Department of Agriculture was established only in 1897, and no statistics of an authentic description were collected prior to 1898.

1. *Manitoba.*

The method of collecting statistics which has been adopted involves the distribution among settlers known to the Department and residing in each township (36 square miles) of cards containing a number of queries.* The recipients of these cards form an estimate of the crops, &c. in their respective districts, and the information which they convey is utilised by the Department in the compilation of the returns. It is impossible to state, without a more exhaustive inquiry than the writer was able to make how much importance should be attached to these returns, but there seems no reason to doubt their substantial accuracy. Statistics relating to the acreage under different crops and the yield per acre in the Province from 1883 to 1904 will be found in the following tables:—

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* The following is a copy of the card in question:—

Department of Agriculture and Immigration.

Dear Sir, Winnipeg, May 15th, 1903.

In order that the Bulletin may be issued on June 10th, it is requested that the following questions be answered and this card returned, so as to reach us by the first day of June.

Kindly exercise the greatest care to ensure accuracy in reporting the area under crop as this is the basis of the whole year's statistics.

A duplicate report form is sent you to be filled up and kept for future reference.

Yours truly,
R. P. ROBLIN.

Report from Twp. _____ Range _____
Municipality _____
Name of Reporter _____
Post Office _____

What areas are or will be sown to the following:—

ACRES.

1. Wheat _____
2. Oats _____
3. Barley _____
4. Flax _____
5. Rye _____
6. Peas _____
7. Buckwheat _____
8. Corn _____
9. Potatoes _____
10. Roots _____
11. What areas of brome grass in your township?
12. Date seeding began _____
13. Date seeding was general _____
14. Date seeding was finished _____
15. Number of farm hands employed _____
16. How many more are required? _____
17. Number of female servants employed _____
18. How many more are required? _____
19. How many cattle were fed for beef during the winter? _____
20. How many milch cows in your township?
21. How has stock wintered?
    Horses _____
    Cattle _____
    Sheep _____
    Pigs _____
22. Give brief notes on crop prospects _____
23. What is the condition of meadows and pastures? _____
24. Was Arbor Day generally observed? _____
25. Has your cheese factory or creamery commenced operations for the season? _____
    Name of factory _____
    Date of opening _____
26. How many farmers are there in your township? _____
27. Remarks on general subjects _____

N.B.—Kindly give name of reporter, and township and range for which report is sent, otherwise we cannot give you credit for the report in our books.

I. Table* showing Acreage under Crops in the Province of Manitoba during each of the Years from 1883 to 1904,† together with Percentage of the Area of each Crop in relation to the Total Area in Crop in each Year.

(Total Land Area in the Province of Manitoba, 41,169,098 Acres.)

Crop.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Wheat	260,842	307,020	357,015	384,441	432,134	518,000	623,245	746,058	916,664	875,990	1,003,640
Oats	215,431	133,044	157,026	161,030	155,176	170,693	218,744	235,534	305,644	332,974	388,529
Barley	60,281	40,936	51,189	69,565	56,110	70,147	80,238	66,035	89,828	97,644	114,762
Total area in above grain crops.	536,554	481,000	565,228	615,036	643,420	758,840	922,227	1,047,627	1,312,136	1,306,608	1,506,931
Percentage of area in :—	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Wheat	48·61	63·83	63·16	62·51	67·16	68·26	67·58	71·22	69·86	67·04	66·60
Oats	40·15	27·66	27·78	26·17	24·12	22·40	23·72	22·48	23·29	25·49	25·78
Barley	11·24	8·51	9·06	11·33	8·72	9·25	8·70	6·30	6·85	7·47	7·62
	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00
Percentage of the total area of the Province in above grain crops.	1·37	1·16	1·37	1·40	1·56	1·84	2·25	2·54	3·19	3·17	3·66

Crop.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Wheat	1,010,186	1,140,276	999,598	1,290,882	1,488,232	1,629,995	1,457,396	2,011,835	2,039,940	2,442,873	2,412,235
Oats	413,686	482,658	442,445	463,141	514,824	575,136	429,108	689,951	725,060	855,431	943,074
Barley	119,528	153,839	127,885	153,266	158,058	182,912	155,111	191,009	329,790	326,537	361,004
Total area in above grain crops.	1,543,400	1,776,773	1,569,928	1,912,289	2,161,114	2,388,043	2,041,615	2,892,795	3,094,790	3,624,841	3,716,313
Percentage of area in :—	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Wheat	65·45	64·18	63·67	67·50	68·87	68·26	71·38	69·55	65·91	67·42	64·90
Oats	26·80	27·16	28·18	24·48	23·82	24·08	21·02	23·85	23·43	23·58	25·38
Barley	7·75	8·66	8·15	8·02	7·31	7·66	7·60	6·60	10·66	9·00	9·72
	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00
Percentage of the total area of the Province in above grain crops.	3·07	4·32	3·87	4·67	5·25	5·81	4·96	7·27	7·52	8·84	9·02

II. Table showing the Total Yield of Crops in the Province of Manitoba, during each of the Years from 1883 to 1904.

Crop.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.
Wheat	5,686,355	6,174,182	7,429,440	5,893,480	12,351,724	7,000,000†	7,201,519	14,665,769	23,191,599	14,453,835	15,615,923
Oats	9,478,964	4,064,494	6,164,283	4,049,904	7,265,237	—	3,415,104	9,513,443	14,762,605	11,654,090	9,823,935
Barley	1,808,430	1,363,028	1,113,481	1,300,965	1,925,231	—	1,051,551	2,069,415	3,197,876	2,831,676	2,547,653
Yield per acre :—	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.
Wheat	21·80	20·11	20·80	15·33	25·70	16·20†	12·40	19·65	25·30	16·50	15·56
Oats	44·00	30·55	40·53	25·15	46·20	—	16·80	40·30	48·29	35·00	25·28
Barley	30·00	33·83	29·00	18·70	34·31	—	13·10	31·33	35·60	29·00	22·11

Crop.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.
Wheat	17,172,883	31,775,038	14,371,806	18,261,950	25,313,745	27,922,230	13,025,252	50,502,085	53,077,267	40,116,878	39,162,458
Oats	11,907,854	22,555,733	12,502,318	10,629,513	18,023,944	22,318,378	8,814,312	27,796,588	34,478,160	33,035,774	36,289,979
Barley	2,981,716	5,645,036	3,171,747	3,183,602	4,611,314	5,379,156	2,939,477	6,536,155	11,848,422	8,707,252	11,177,970
Yield per acre :—	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.	Bushels per Acre.
Wheat	17·00	27·86	14·33	14·14	17·01	17·13	8·90	25·10	26·00	16·42	16·23
Oats	28·80	46·73	28·25	22·70	35·02	38·80	20·50	40·30	47·50	38·62	38·80
Barley	25·87	36·69	24·80	20·77	29·17	29·40	18·90	34·20	35·90	26·66	30·54

* Compiled from the Reports and Bulletins of the Department of Agriculture, Manitoba.

† Estimated.

2. The North-West Territories of Alberta, Assiniboia, and Saskatchewan.

The following tables show for the years 1898 to 1904 the acreage under different crops in the Sixteen Statistical Districts, the total area under grain crops in the North-West Territories, and the proportion of the area under the several crops :—

I. Table showing the Acreage under Crops in each of the Sixteen Statistical Districts of the North-West Territories during each of the Years 1898 to 1904.*

Spring Wheat.

Districts.	Total Land Area in Acres.†	1898.	1899.	1900.	1901.	1902.	1903.	1904.‡
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
1	3,018,240	50,455	78,813	79,375	105,476	128,253	157,001	182,121
2	9,368,320	—	1,466	1,682	5,365	15,893	31,396	56,512
3	2,304,000	71,372	65,472	71,807	84,002	96,504	132,888	159,465
4	3,255,040	80,348	104,949	118,752	135,675	143,577	173,385	195,125
5	10,140,800	42,859	51,057	73,806	90,840	124,728	163,740	196,488
6	24,140,800	28	35	49	198	222	719	1,796
7	5,590,400	13,487	10,595	12,369	13,952	23,413	50,366	88,340
8	19,141,120	Not yet under settlement.						
9	19,077,120	17,002	15,632	23,535	33,508	46,923	66,047	85,898
10	12,441,600	702	440	1,165	937	1,347	1,913	3,085
11	10,782,720	—	—	—	—	—	367	400
12	30,903,040	24,122	27,604	23,699	24,899	29,067	33,634	36,997
13	8,709,120	1,246	1,608	1,840	2,025	1,357	1,640	3,280
14	7,303,680	572	471	465	330	831	443	500
15	9,469,440	4,107	1,808	1,723	1,298	331	663	663
16	7,534,080	1,280	3,573	2,597	6,192	13,312	23,032	39,129
Total for the Territories.	187,932,617†	307,580	363,523	412,864	504,697	625,758	837,234	1,049,799

Fall Wheat.

							Acres.	Acres.§
9	19,077,120						29	—
12	30,903,040						294	323
13	8,709,120						24	48
14	7,303,680						256	290
15	9,469,440						112	115
16	7,534,080						2,754	4,707
Total for the Districts mentioned.	82,996,480						3,469	5,483

Oats.

		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
1	3,018,240	14,919	16,334	14,276	22,755	30,610	53,498	85,596
2	9,368,320	—	387	108	1,454	5,026	12,238	17,133
3	2,304,000	8,469	17,911	17,433	24,284	24,722	36,911	55,366
4	3,255,040	14,558	19,938	24,474	21,577	33,205	49,010	93,515
5	10,140,800	11,614	13,921	16,539	22,039	44,778	45,885	57,356
6	24,140,800	200	568	690	1,622	2,441	2,331	4,662
7	5,590,400	9,218	8,298	12,279	15,638	24,471	45,020	78,785
8	19,141,120	Not yet under settlement.						
9	19,077,120	6,840	5,655	9,303	12,977	26,581	32,835	60,644
10	12,441,600	538	453	1,071	905	1,366	2,025	3,632
11	10,782,720	—	—	—	—	—	343	450
12	30,903,040	24,246	32,802	45,930	65,679	62,454	90,299	114,552
13	8,709,120	3,290	3,804	10,492	13,275	18,821	23,060	21,907
14	7,303,680	2,830	2,885	4,803	4,383	11,024	9,955	10,535
15	9,469,440	5,263	6,186	9,161	11,167	10,471	14,198	18,315
16	7,534,080	3,185	5,826	6,713	8,813	14,397	22,454	33,781
Total for the Territories.	187,932,617†	105,077	134,938	175,439	229,439	310,367	440,662	656,229

* Compiled from the Annual Reports of the Department of Agriculture, Regina, *v.d.* A card somewhat similar to the card issued by the Department of Agriculture of Manitoba (*see* p. 60) is issued by the Department of Agriculture of the North-West Territories.

† These areas are calculated from the areas given in square miles for each district. There is a considerable discrepancy between the total of these figures and the total area as quoted on page viii. of the Census Report, which is 187,932,617 acres. The total of the figures for the Sixteen Districts is 183,243,520 acres.

‡ Estimated by Mr. J. R. C. Honeyman, Deputy Commissioner of Agriculture, Regina, June 27th, 1904, and corrected to 15th September 1904.

§ Estimate in Bulletin, No. 13, Department of Agriculture, Regina, 15th September, 1904.

TABLE showing the ACREAGE under CROPS in each of the SIXTEEN STATISTICAL DISTRICTS of the NORTH-WEST TERRITORIES during each of the Years 1898 to 1904—*continued*.

BARLEY.

Districts.	Total Land Area in Acres.*	1898.	1899.	1900.	1901.	1902.	1903.	1904.†
		Acres	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
1	3,018,240	1,892	2,107	1,881	1,721	3,435	4,631	5,788
2	9,368,320	—	80	1	21	106	330	660
3	2,304,000	1,629	1,658	1,452	2,734	2,919	5,786	10,125
4	3,255,040	1,204	856	1,056	1,353	1,394	4,903	6,128
5	10,140,800	756	648	748	749	1,080	1,856	2,598
6	24,140,800	42	47	36	65	42	171	513
7	5,590,400	496	373	443	453	1,415	2,939	4,261
8	19,141,120	Not yet under settlement.						
9	19,077,120	2,275	1,834	2,607	4,118	3,778	6,880	9,976
10	12,441,600	87	53	79	53	76	167	200
11	10,782,720	—	—	—	—	—	16	100
12	30,903,040	6,551	4,560	5,101	8,311	12,568	25,293	47,792
13	8,709,120	617	768	2,179	2,171	2,982	5,940	9,681
14	7,303,680	447	306	689	1,042	4,185	3,922	4,000
15	9,469,440	629	553	792	1,039	1,287	3,476	5,943
16	7,534,080	467	433	468	872	1,148	3,460	4,325
Total for the Territories.	187,932,617*	17,092	14,276	17,532	24,702	36,445	69,770	112,090

FLAX.

		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
1	3,018,240	—	—	—	—	8,878	15,173	7,586
2	9,368,320	—	—	—	—	2,050	5,262	2,631
3	2,304,000	—	—	—	—	450	481	500
4	3,255,040	—	—	—	—	167	1,672	1,421
5	10,140,800	—	—	—	—	1,269	3,182	2,863
6	24,140,800	—	—	—	—	—	58	58
7	5,590,400	—	—	—	—	2,749	2,617	1,962
8	19,141,120	Not yet under settlement.						
9	19,077,120	—	—	—	—	1,131	2,959	2,959
10	12,441,600	—	—	—	—	—	10	10
11	10,782,720	—	—	—	—	—	230	175
12	30,903,040	—	—	—	—	121	523	575
13	8,709,120	—	—	—	—	50	11	12
14	7,303,680	—	—	—	—	—	11	11
15	9,469,440	—	—	—	—	21	32	35
16	7,534,080	—	—	—	—	181	210	140
Total for the Territories.	187,932,617*	—	—	—	—	17,067	32,431	20,938

II. TABLE showing the TOTAL AREA under GRAIN CROPS in the NORTH-WEST TERRITORIES.§

Crop.	1898.	1899.	1900.	1901.	1902.	1903.	1904.‡
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Wheat	307,580	363,523	412,864	504,697	625,758	840,703	1,055,282
Oats	105,077	134,938	175,439	229,439	310,367	440,662	656,229
Barley	17,092	14,276	17,532	24,702	36,445	69,770	112,090
Flax	—	—	—	—	17,067	32,431	20,938
Total	429,749	512,737	605,835	758,838	989,637	1,383,566	1,844,539

* These areas are calculated from the areas given in square miles for each district. There is a considerable discrepancy between the total of these figures and the total area as quoted on page viii. of the Census Report, which is 187,032,617 acres. The total of the figures for the Sixteen Districts is 183,243,520 acres.

† Estimated by Mr. R. C. Honeyman, Deputy Commissioner of Agriculture, Regina, 27th June 1904, and corrected to 15th September 1904.

‡ Estimate in Bulletin, No. 13, Department of Agriculture, Regina, 15th September 1904.

§ Compiled from the Annual Reports of the Department of Agriculture and Immigration.—North-West Territories. Regina, *v.d.*

III. Tables showing the Percentages of the Area under different Crops in the North-West Territories.

(1.) Percentages of the Area under different Crops in the Area under Crop.

Crop.	1898.	1899.	1900.	1901.	1902.	1903.	1904.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Wheat	71·58	70·90	68·20	66·51	63·23	60·77	57·21
Oats	24·45	26·32	28·98	30·24	31·37	31·85	35·57
Barley	3·97	2·78	2·82	3·25	3·68	5·03	6·08
Flax	—	—	—	—	1·72	2·35	1·14
Total	100	100	100	100	100	100	100

(2.) Percentages of the Area under Crop in relation to the Total Land Area of the North-West Territories. (Total Land Area=187,932,617 Acres.)

	1898.	1899.	1900.	1901.	1902.	1903.	1904.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Area in crop	0·206	0·273	0·322	0·406	0·526	0·728	0·981
Area not in crop	99·794	99·727	99·678	99·594	99·474	99·272	99·019
Total	100	100	100	100	100	100	100

IV. Tables showing Total Production and Yield per Acre of different Crops in the North-West Territories during the Years 1898–1904.*

(1.) Total Production.

Crop.	1898.	1899.	1900.	1901.	1902.	1903.	1904.†
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.
Spring Wheat	5,542,478	6,915,623	4,028,294	12,808,447	13,956,850	16,029,149	20,340,000
Fall Wheat	—	—	—	—	—	82,420	106,000
Oats	3,040,307	4,686,036	4,226,152	11,113,066	10,661,295	14,179,705	21,473,500
Barley	449,512	337,421	353,216	795,100	870,417	1,741,209	3,035,000
Flax	—	—	—	—	158,155	292,853	205,700

(2.) Yield per Acre.

Crop.	1898.	1899.	1900.	1901.	1902.	1903.	1904.‡
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.
Spring Wheat	18·01	19·02	9·75	25·37	22·30	19·00	19·37
Fall Wheat	—	—	—	—	—	23·86	19·31
Oats	28·93	34·81	28·08	48·43	34·35	32·17	32·72
Barley	26·29	23·62	20·72	32·18	23·88	24·65	27·07
Flax	—	—	—	—	9·26	9·03	9·77

* Annual Reports of the Department of Agriculture, Regina, 1904.
† Bulletin, No. 13, Department of Agriculture, Regina, 15th September 1904, subject to correction.
‡ Calculated from expected production and acreage, subject to correction.

3. *Manitoba and North-West Territories combined.*

The following tables show the total area under the several crops in Manitoba and the North-West Territories combined at different periods, together with particulars as to the total production of wheat, &c. :—

I. TABLE showing the TOTAL AREA under WHEAT, OATS, BARLEY, and FLAX in the PROVINCE of MANITOBA and the NORTH-WEST TERRITORIES combined, from 1898–1904.

Year.	Wheat.			Oats.		
	Manitoba.	Territories.	Total.	Manitoba.	Territories.	Total.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
1898	1,488,232	307,580	1,795,812	514,824	105,077	619,901
1899	1,629,095	363,523	1,993,518	575,136	134,938	710,074
1900	1,457,396	412,864	1,870,260	429,108	175,439	604,547
1901	2,011,835	504,697	2,516,532	689,951	229,439	919,390
1902	2,039,940	625,758	2,665,698	725,060	310,367	1,035,427
1903	2,442,873	810,674	3,283,547	855,431	440,662	1,296,093
1904	2,412,235	1,055,282	3,467,517	943,574	656,229	1,599,803

Year.	Barley.			Flax.		
	Manitoba.	Territories.	Total.	Manitoba.	Territories.	Total.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
1898	158,058	17,092	175,150	—	—	—
1899	182,912	14,276	197,188	—	—	—
1900	155,111	17,044	172,155	—	—	—
1901	191,009	24,702	215,711	—	—	—
1902	329,790	36,445	366,235	Not given.	17,067	—
1903	326,537	69,667	396,204	„	32,431	—
1904	361,004	112,090	473,094	35,428	21,038	56,466

II. TABLES showing the TOTAL AREA under CROPS in MANITOBA and the NORTH-WEST TERRITORIES in the CENSUS YEARS, 1891 and 1901, together with the PERCENTAGES under different CROPS. [Census Bulletins,* XIV. and XV.]

(1.) Total AREA under CROP.

	Manitoba.		North-West Territories.		Total.	Total.
	1891.	1901.	1891.	1901.	1891.	1901.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Wheat, spring	896,622†	1,965,080	113,811†	529,447	1,010,433†	2,494,527
Wheat, fall	—	120	—	827	—	947
Barley	56,505	139,672	8,467	22,897	64,972	162,569
Oats	256,211	573,858	61,637	259,552	317,848	833,410
Rye	2,500‡	937	618‡	2,339	3,118‡	3,276
Corn in ear		62		25		87
Buckwheat		56		19		75
Pease		406		115		521
Beans		38		2		40
Mixed grains	—	769	—	484	—	1,253
All grains	1,211,838§	2,680,998	184,533‖	815,707	1,396,371	3,496,705
Hay¶	—	—	—	—	—	—
Forage, summer	—	1,063	—	1,743	—	2,806
Forage, winter	—	42,604	—	15,095	—	57,699
Potatoes	9,791	16,042	3,891	9,925	13,682	25,967
Other field roots	2,102	978	1,877	1,205	3,979	2,183
Flax	6,400‡	14,404	150‡	327	6,550	14,731
Tobacco	3‡	10	2‡	11	5	21
Hops	13	7	—	—	13	7
All crops, acres	1,232,574	2,756,106	194,773	844,020	1,427,347	3,600,126
Grass seed, bushels	849	282	295	1,785	1,144	2,067
Clover seed, bushels		15		38		53
All crops, bushels	—	—	—	—	—	—
Hay and forage, tons	477,759	485,230	155,870	868,833	633,629	1,354,063

* There is a considerable discrepancy between these results and those calculated from the Reports of the Departments of Agriculture of Manitoba and the North-West Territories. It is very difficult to say which should be preferred.

† Including fall wheat. ‡ Estimated. § Including estimated 2,500 acres for area not given.

‖ Including estimate of 618 acres for areas not given.

¶ Area of hay not given; nearly the whole cut on natural prairie.

(2.) Percentage of Areas under different Crops in the Census Years, 1891 and 1901, calculated from the Census Returns.*

Crop.	Manitoba.		North-West Territories.	
	1891.	1901.	1891.	1901.
Wheat	73·98	73·29	61·67	65·01
Oats	21·15	21·42	33·44	31·79
Barley	4·66	5·21	4·59	2·84
Rye, Corn in ear, Buckwheat, Pease, Beans, Mixed grains	0·21	0.08	0·30	0·36
Total	100	100	100	100

IV. Table showing the Production of Wheat in Manitoba and the North-West Territories, together with the Yield in Bushels per Acre from 1898 to 1904.

Production in Bushels.

	1898.	1899.	1900.	1901.	1902.	1903.	1904.
Manitoba (spring wheat)	25,313,155	27,922,230	13,025,252	50,502,035	53,077,267	40,116,878	39,162,458†
North-West Territories (fall wheat).	—	—	—	—	—	82,420	106,000†
North-West Territories (spring wheat).	5,542,478	6,915,623	4,028,294	12,808,447	13,956,850	16,929,149	20,340,000†
Total	30,855,633	34,837,853	17,053,546	63,310,482	67,034,117	56,228,447	59,608,458†

Yield in Bushels per Acre.

Manitoba (spring wheat)	17·01	17·13	8·9	25·1	26.0	16·42	16·52
North-West Territories (fall wheat).	—	—	—	—	—	23·86	19·33
North-West Territories (spring wheat).	18·01	19·02	9·75	25·37	22·30	19·00	19·37
Together	17·51	17·53	9·11	25·16	25·14	17·14	17·19

V. Table showing the Total Yield of Wheat, Oats, and Barley in the Provinces of Ontario, New Brunswick, Manitoba, and North-West Territories, from 1898 to 1903.

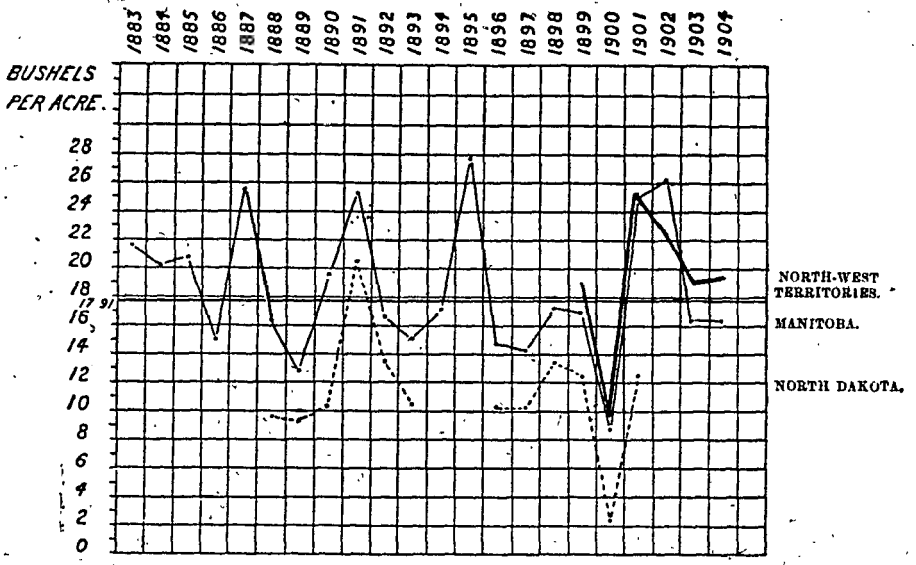
Year.	Wheat.		Oats.		Barley.	
	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
1898	3,262,344	63,298,664	3,182,440	112,177,871	619,296	17,500,074
1899	3,469,068	56,810,807	3,253,392	122,049,829	692,682	20,661,651
1900	3,342,672	47,867,917	3,182,373	108,015,481	755,018	20,322,666
1901	3,821,177	85,305,198	3,511,768	122,189,136	857,308	24,191,871
1902	3,740,007	93,569,450	3,708,098	156,884,243	1,032,092	34,716,142
1903	4,215,197	78,495,742	4,118,967	163,235,189	1,109,463	35,034,010

* There is a considerable discrepancy between these results and those calculated from the Reports of the Departments of Agriculture of Manitoba and the North-West Territories. It is very difficult to say which should be preferred.

† Estimated by the Departments of Agriculture of Manitoba and the North-West Territories.

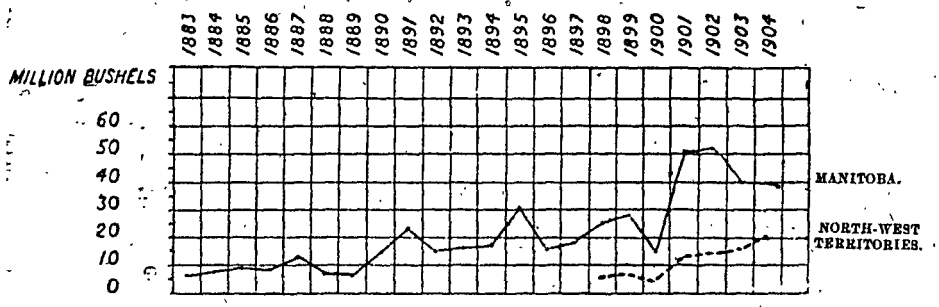
The following diagrams are appended in connection with the tables given above:—

I. Diagram showing the Yield in Bushels of Wheat per Acre in Manitoba, in the North-West Territories, and in North Dakota, U.S.A.,* for the years for which Statistics are available.

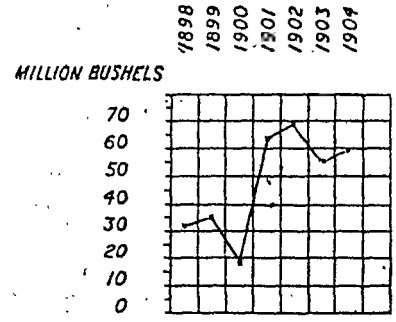


Base line = Average yield for Manitoba for ten years (from 1889–1898) = 17·91 bushels per acre.

II. Diagram showing the Production of Wheat in Manitoba from 1883 to 1904, and in the North-West Territories from 1898 to 1904.



III. Diagram showing the total Production of Wheat in Manitoba and the North-West Territories from 1898 to 1904.†



* Reports of the Commissioner of Agriculture of North Dakota, *v.d.*, and from the tables above.

† It is not possible to give combined figures for the years prior to 1898.

(xxii.) Flour Milling in Manitoba and the North-West Territories.

Although the flour milling industry in the Territories has not yet reached large proportions, there are signs of increase. At present there are 27 modern roller process mills, with a daily milling capacity of 2,950 barrels. The production of 1903 was about half a million barrels, of which by far the larger quantity was consumed in the Territories. This represented 2,260,000 bushels of wheat, or about 14 per cent. of the crop of the Territories. The number of employees in the mills is 188.*

Flour milling is carried on to a much greater extent in Manitoba.

The miller is in one sense in a more advantageous position than the trader in wheat for export, because the miller has not to consider the necessity of transporting his wheat to the lake ports (on Lake Superior) prior to the close of navigation. He can buy his wheat all the year round. The export trader must, on the other hand, if he can, buy his wheat in time for shipment by the great lakes.†

The farmer is thus often enabled to choose between two different classes of demand. He may refuse to sell his wheat to the elevator for export on the ground that he can get at least as good a price from the miller, with the advantage that he can draw his wheat to the miller's elevator at his leisure.‡

The influence of the external or export market on the domestic market is, of course, considerable; but a case may arise in which the miller may give and the farmer may receive a price higher than the export price, because the domestic price is not handicapped by the condition of immediate delivery.‡

The increase of the milling business in Canada is on many grounds to be desired. The by-products of the manufacture of flour are important for cattle feeding, and in proportion as they are made available the business of cattle raising throughout the North West would be stimulated. Moreover, the transportation problem would be more easily solved, since flour will bear a greater transportation cost than wheat per unit of quantity, and thus it may be transported by an all-land route when the water route is closed in winter.

The very extensive water powers in the neighbourhood of Winnipeg might be effectively utilised in providing motive power for a great number of new mills.

(xxiii.) Estimates of the possible Area and Yield of Wheat-producing Lands in the North West.

The cultivation of wheat depends upon so great a variety of conditions that any estimate of the area physically or economically susceptible of being utilised for wheat production must be more or less speculative. Hypothetical curves purporting to indicate the "northern limit of cereal production" may at once be set aside as being of little value. Data for the plotting of such curves are not yet forthcoming, and, if they were, they would always be changing.

The following are the principal conditions which must be taken into account in forming any estimate. The mere number of these and their reacting influences upon each other will sufficiently suggest the difficulty of exhaustive inquiry.

1. The chemical composition and character of the superficial soil and of the subsoil.
2. The duration of the seasons.
3. The temperature of the air during the period of growth.
4. The direction and force of the prevailing winds and the frequency of violent storms.

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* "Annual Report on the Department of Agriculture of the North-West Territories," 1903. Regina, 1904, p. 121.

† For the reasons for this, *see* section on "The Marketing and Transportation of Wheat," p. 97.

‡ *See* pp. 102–104.

5. The moisture of the soil and the relations between precipitation (rain and snow fall) and evaporation.
6. The probability of floods from the overflow of rivers and lakes.
7. The duration of sunshine.
8. The proportion of the area in question in which the physical conditions are favourable. (Mere sporadic growth would prove little.)
9. The stage in the acclimatisation of the wheat plant.

When the primary physical conditions were understood, it would be necessary to determine whether the cultivation of wheat could be carried on economically :—

(*a*) for local or domestic consumption only; or
(*b*) for export either as wheat or as flour.

The latter condition would depend upon—

(*a*) the facilities for transportation;
(*b*) the proximity or remoteness of markets;
(*c*) the market price.

Whether or not wheat would be cultivated within the region, and to what extent it would be cultivated would depend upon the presence of the cultivator, and, other things being equal, upon his skill and disposition, and the relative estimate which he might place upon the respective advantages of the production of wheat, of other crops, and of animals, and of totally different means of utilising his land. If the area in question were assumed to be cultivated by employed labour engaged under expert direction and producing those crops economically most profitable, the cost of production would be an obvious and important factor. Under the present conditions of the North West, wheat is not, as a rule, produced under such circumstances. Theoretically, however, the question of cost of production may be held to enter with rent into the calculation in which different means of utilising land are compared.*

While thus very great difficulties attend any attempt to form a reliable estimate of the area in the North West in which wheat production is physically possible and economically advantageous, certain of the data necessary for an estimate under the first head are available. The meteorological data have already been to some extent presented and fuller information can readily be obtained from the records of the Meteorological Service. Although these extend for only 20 years over the area, yet they are very valuable so far as they go. From these records certain provisional conclusions can be formed. Less exact than these data, there is the experience of competent persons who have lived in the country for long periods, and who have had opportunities of travelling over considerable portions of it. The information derived from the Dominion Land Surveyors regarding the surveyed lands is also often extremely valuable in detail.

Taking account of the physical conditions only, and co-ordinating in a general way such information as is available, an estimate has been formed showing in a very general way the relative fertility of different portions of the North West.

It must be observed that there can be no finality in such an estimate. Any estimate must be based at best on existing knowledge of the country, and that is always increasing; it must be based also upon existing conditions (upon the stage of acclimatisation of wheat for example) and these are always changing. We may take in order the physical divisions previously indicated.

1. *The Eastern Prairie Slope. Southern Sub-Division.*

Excluding the hilly portions and those portions at present periodically flooded, the whole of this region may be regarded as capable of producing a *certain* crop of wheat. Even when, as occasionally happens, wheat is

* *See* remarks on estimating the cost of production of wheat, p. 58.

damaged by frost or hail, it is not thereby rendered absolutely worthless. It may still be used or sold, but the quality being deteriorated, the grade is reduced, and a lower price is obtained. The past yields from this portion of the country are relatively high.

2. *Eastern Prairie Slope. Northern Sub-Division.*

Owing to the meteorological conditions of this area the wheat crop is *less certain* in those portions of the area which are, from the nature of the soil, suited for wheat cultivation. In the more northerly part of the area, a wheat crop would be *quite uncertain.*

3. *Middle Prairie Slope. Southern Sub-Division.*

Here conditions prevail similar to those indicated as occurring in the area first described. Wheat is a *certain* crop (with the same qualifications as in the former division).

4. *Middle Prairie Slope. Northern Sub-Division.*

The climatic and soil conditions are similar to those of the Northern Sub-Division of the Eastern Slope. Wheat is a *less certain* crop. In the more northerly parts of the area a wheat crop would be *quite uncertain.*

5. *Western Prairie Slope. Southern Sub-Division.*

The extreme eastern portion of this division corresponds in soil and in climatic conditions to the slope immediately below it; and therefore a *certain* crop may be expected. The middle portion of the sub-division is within the semi-arid area in which, for the reasons given in the account of this area, wheat is *not a certain* crop; but is a crop which may within limits and for a portion of the area ultimately turn out to be a relatively certain crop in so far as it is cultivated.

6. *Western Prairie Slope. Northern Sub-Division.*

A great part of the south-eastern and of the middle western part of this area may be regarded as susceptible of producing a *certain* crop. The north-western part of this sub-division is however more suitable for the cultivation of oats than of wheat.

The cleavage of the areas of different fertility is not however from east to west or from north to south. It is rather obliquely from south-east to north-west. In the north-eastern angle of the great quadrilateral, which comprises the Canadian North West, the conditions are relatively unfavourable, while they are also unfavourable in the south-western angle. On the other hand, the conditions are relatively favourable in the south-eastern corner and in the north-western, and in the belt connecting these two areas. The extreme north-west is, however, not favourable.

In addition to this rough sketch of the lines of greatest fertility, the writer is able, by the kindness of the authors, to offer five estimates, made entirely independently of each other. The first, second, and fourth of these estimates have been prepared especially for the purposes of this report.

The most important of these estimates are the following:—

Estimate One has been drawn up by two gentlemen jointly.* The positions and opportunities which the authors of this estimate have enjoyed for many years, together with their qualifications, have given them almost unrivalled opportunities for forming a judgment upon the fertility of the different areas in the North West. While such estimates must undoubtedly be looked upon as matters of opinion rather than as conclusions from adequate scientific data, this estimate is the result of a very careful consideration of such data as are available; many details are given, and it is therefore a document to which considerable importance must inevitably be attached.

* The names of the authors have been given confidentially.

Estimate Two has been drawn up in less detail by a gentleman of equal authority and experience.

Estimate Three is extracted from the interesting pamphlet "Wheat Growing in Canada,"* by Dr. Saunders, the Director of Experimental Farms, whose position and qualifications entitle his estimate to serious attention.

Estimate Four consists of a map prepared by a competent authority, and showing the relative possibilities of certain areas as estimated from the published reports of the Meteorological Service.

These four estimates afford statements of the views upon the fertility of the North West altogether of five highly responsible persons.

Estimate One.

(For text of Estimate, *see* Appendix A, p. 116.)

This estimate is accompanied by a map† which indicates in colours the relative fertility of the different regions.

1. The area coloured yellow on the map, traversing all the three prairie slopes, is the area which is, everything considered, the best adapted for wheat production. It contains about 36,000,000 acres. Of that amount about one half, or 18,000,000 acres, may be regarded as averaging first class soil. At the same time moisture and other climatic conditions are such that in a cycle of ten years the average yield of the whole area would be high. One fifth of the whole, or 7,200,000 acres, is good soil on the average, while the balance of 10,800,000 acres, or 30 per cent. of the whole, is too rough to be economically cultivated or is occupied by water. Thus 70 per cent. of this region is suitable for wheat growing, while a considerable portion of the balance is fairly good for pasturage or for the growth of timber.

Not quite the whole of the area suitable for wheat growing is suitable for mixed farming. The proportion suitable for mixed farming may be set down as approximately 45 per cent. of the whole.

For the reasons explained above it is impossible to assume that the whole of the area suitable for wheat production would be so employed every year. If the region coloured yellow on the map were fully settled, and if every farm were being cultivated, there would be approximately 30 per cent. of the possible wheat area in cultivation under crop in any one year. This proportion would give 21 per cent. of the whole area in question or 7,500,000 acres. If 1,500,000 acres were devoted to crops other than wheat, there would be 6,000,000 acres of land producing wheat per year.

2. The area on the map coloured yellow, with blue horizontal lines, contains about 47,000,000 acres. Of that amount 35 per cent. may be regarded as naturally first class land; 10 per cent. more may be greatly improved by irrigation; 15 per cent. is fair; 40 per cent. varies from fair to poor land. Very little land in this region is wholly without fertility. Of this area 42,000,000 acres may be regarded as fit for cultivation and settlement.

The portion of the area coloured green on the map in Saskatchewan and Northern Alberta is covered with timber to the extent of probably 20 per cent., or about 10 per cent. of the whole area. The water areas may be estimated at about 3 per cent. of the whole.

Assuming that 10 per cent. of good but dry land will be irrigated, the first class portion or 45 per cent. of the whole would yield of wheat producing lands about 31 per cent. of the whole. If to this be added one third of the 15 per cent. classed as fair, there would be 36 per cent. of the whole or 17,000,000 acres of land which may be regarded as capable of producing wheat. Since this area as a whole is a mixed farming area, it may be that allowance ought to be made for an increase in the annually utilisable wheat area. This may therefore be stated at slightly more than one third or 6,000,000 acres.

3. The portion on the map coloured yellow, with blue vertical lines, may be regarded as suitable mainly for pasturage. It is wholly within the semi-arid region, where the effect of irrigation on wheat cultivation has still to be

* Ottawa, 1904. † *See* Map II. at end of volume.

seen. The area contains 28,000,000 acres. Probably about one seventh, or 4,000,000 acres are suitable for mixed farming, and of that amount probably 1,000,000 acres might be regarded as being likely to be devoted annually to wheat.

4. The portion coloured blue on the map contains an area of 42,000,000 acres. As regards about one-half, it consists of rough broken country, covered with timber and scrub growth, and with a considerable water area. In the half that remains, or 21,000,000 acres, mixed farming might be carried on upon about 3,000,000 acres. Of this area about 750,000 acres would be annually available for wheat production.

It will be noticed that there is also a very considerable area in the map which is not coloured. Though a large proportion of this area would be useless for wheat-growing owing to mountains, rocks, water, marshes or muskegs, &c., it is not assumed that it would be all worthless from the point of view of food production; but the authors of this estimate are of opinion that for their main purpose it is not necessary to take it into consideration.

The following table contains a recapitulation of the details given above:—

Areas.	Total.	Estimated Area susceptible of Settlement or Cultivation.	Annually available for Crop Production.	Annually available for Wheat Production.
	Acres.	Acres.	Acres.	Acres.
I.	36,000,000	25,000,000	7,500,000	6,000,000
II.	47,000,000	42,000,000	8,500,000	6,000,000
III.	28,000,000	4,000,000	4,000,000*	1,000,000
IV.	42,000,000	21,000,000†	3,000,000*	750,000
Total	153,000,000	92,000,000	23,000,000	13,750,000

The following tables summarise the conclusions formed by the authors of this estimate as to the probable yield from the areas above described, and tables are also appended, showing the areas of different fertility and the areas available for wheat cultivation in relation to the Administrative Divisions of the North West:—

(1.) Table showing the Estimated Yield from the Area annually available for Wheat Production.

Areas	Annually available for Wheat Production.	Average Yield per Acre.	Total Yield.	Total available for Export.
	Acres.	Bushels.	Bushels.	Bushels.
I.	6,000,000	18·5	111,000,000	74,000,000
II.	6,000,000	18·5	111,000,000	74,000,000
III.	1,000,000	18·5	18,500,000	12,000,000
IV.	750,000	18·5	13,875,000	9,250,000
Total	13,750,000	18·5	254,375,000	169,250,000

(2.) Table showing the Areas of Different Fertility in relation to the Administrative Divisions.

Areas of Different Fertility.	Manitoba.	Alberta.	Saskatchewan.	Assiniboia.	Total.
	Acres.	Acres.	Acres.	Acres.	Acres.
Yellow	12,700,000	400,000	7,600,000	15,300,000	36,000,000
Yellow with blue horizontal lines.	400,000	23,000,000	12,600,000	11,000,000	47,000,000
Yellow with blue vertical lines.	—	1,500,000	—	26,500,000	28,000,000
Blue	4,000,000	14,000,000	23,000,000	1,000,000	42,000,000
	17,100,000	38,900,000	43,200,000	53,800,000	153,000,000

* Mixed farming. † Including land suitable only for pasturage.

(3.) TABLE showing the EXTENT of the AREAS of DIFFERENT FERTILITY in so far as they are suitable for the CULTIVATION of WHEAT, and showing also the RELATION of these AREAS to the ADMINISTRATIVE DIVISIONS.

Areas of Different Fertility.	Manitoba.	Alberta.	Saskatchewan.	Assiniboia.	Total.
	Acres.	Acres.	Acres.	Acres.	Acres.
Yellow	8,900,000	280,000	5,300,000	10,700,000	25,180,000
Yellow with blue horizontal lines.	144,000	8,280,000	4,436,000	3,960,000	16,820,000
Yellow with blue vertical lines.	—	52,500	—	827,500	880,000
Blue	280,000	980,000	1,610,000	70,000	2,940,000
Total	9,324,000	9,592,500	11,346,000	15,557,500	45,820,000

Of this total of 45,820,000 acres suitable for wheat-growing, about 30 per cent. would be available in any one year, as shown by the following table.

(4.) TABLE showing the AREAS estimated as annually available for WHEAT CULTIVATION in the ADMINISTRATIVE DIVISIONS.

Manitoba.	Alberta.	Saskatchewan.	Assiniboia.	Total.
Acres.	Acres.	Acres.	Acres.	Acres.
2,800,000	2,870,000	3,380,000	4,700,000	13,750,000

Estimate Two.

TABLE showing TOTAL LAND AREA in MANITOBA and the NORTH-WEST TERRITORIES, the Estimated AREA of LAND suitable for SETTLEMENT, and the Estimated possible AREA Annually Available for the PRODUCTION of WHEAT.

	Total Land Area.	Estimated Area in Acres suitable for Settlement.	Estimated possible Area in Acres annually available for the production of Wheat.
	Acres.	Acres.	Acres.
Manitoba	41,169,098	27,000,000	5,990,000
Alberta	64,973,212	21,000,000	4,666,000
Saskatchewan	66,460,859	28,000,000	6,221,000
Assiniboia	56,498,546	25,000,000	5,555,000
Total	229,101,715	101,000,000	22,432,000

TABLE showing ESTIMATED YIELD of WHEAT from above estimated AREA.

	Area annually available for Wheat Production.	Estimated Yield per Acre.	Total Yield.
	Acres.	Bushels.	Bushels.
Manitoba	5,990,000	18·5	110,815,000
Alberta	4,666,000	15·0	69,990,000
Saskatchewan	6,221,000	15·0	93,315,000
Assiniboia	5,555,000	15·0	83,325,000
Total	22,432,000	15·9	357,445,000

* The date of this estimate is April 9th, 1904.

Estimate Three.

(For text of estimate, *see* Appendix B, p. 118.)

This estimate has been published by Dr. Wm. Saunders, Director of Experimental Farms.* The results are summarised in the following table:—

TABLE showing ESTIMATED PROPORTION of TOTAL AREA of the NORTH WEST suitable for CULTIVATION.*

	Total Area, exclusive of Water.	Estimated Proportion suitable for Cultivation.
	Acres.	Acres.
Manitoba	41,000,000	$\frac{2}{3}$rds = 27,000,000
Assiniboia	57,000,000	$\frac{7}{8}$ths = 50,000,000
Saskatchewan	70,000,000	$\frac{3}{4}$ths = 52,000,000
Alberta	64,000,000	$\frac{2}{3}$rds = 42,000,000
Total	232,000,000	171,000,000

Dr. Saunders adds:—"Were one-fourth of the land said to be suitable "for cultivation in Manitoba and the three Provisional Territories under "crop with wheat annually, and the average production equal to that of "Manitoba for the past 10 years, the total crop would be over 812 million "bushels."†

Notes upon the above Estimates.

The authors of the estimates all assume (*a*) the complete settlement of the country—that is a settlement adequate to secure the cultivation of the cultivable area. They also assume (*b*) that a certain proportion of this cultivation will be devoted to wheat. The following tables exhibit a comparison of the estimates in so far as they are comparable.

(1.) TABLE showing COMPARISON of THREE INDEPENDENT ESTIMATES of the FERTILE AREA of the NORTH WEST.

	Estimated Area susceptible of Cultivation or fit for Settlement.	Estimated Area available Annually for Crop Production.	Estimated Area available Annually for Wheat Production.
	Acres.	Acres.	Acres.
Estimate I.	92,000,000	23,000,000	13,750,000
„ II.	101,000,000	—	22,432,000
„ III.	171,000,000	—	42,750,000

(2.) TABLE showing COMPARISON of THREE INDEPENDENT ESTIMATES of FERTILITY by ADMINISTRATIVE DIVISIONS.

Estimate.	Estimated Areas suitable for Cultivation or fit for Settlement.				
	Manitoba.	Alberta.	Saskatchewan.	Assiniboia.	Total.
	Acres.	Acres.	Acres.	Acres.	Acres.
I.‡	—	—	—	—	92,000,000
II.	27,000,000	21,000,000	28,000,000	25,000,000	101,000,000
III.	27,000,000	42,000,000	52,000,000	50,000,000	171,000,000

* "Wheat Growing in Canada," Ottawa, 1904. *See* Abstract in Appendix B, p. 118.

† *Id.*, page 3.

‡ The divisions adopted by the authors of Estimate One, do not correspond with those adopted by the authors of Estimates Two and Three.

(3.) TABLE showing COMPARISON of THREE INDEPENDENT ESTIMATES of the FERTILITY of the NORTH WEST by YIELDS.

Estimate.	Estimated Annual Area to be cultivated in Wheat.	Estimated Average Yield per Acre.	Estimated Total Average Yield.	Estimated Quantity required to be retained for Consumption in Canada.	Estimated Quantity available for Exports
	Acres.	Bushels.	Bushels.	Bushels.	Bushels.
I. - -	13,750,000	18·5*	254,375,000	85,125,000	169,250,000
II. -	5,990,000	18·5†	110,815,000	—	—
	16,442,000	15‡	246,630,000	—	—
	22,432,000	15·9	357,445,000	—	—
III. - -	42,750,000	19§	812,250,000	200,000,000	612,250,000‖

The discrepancy between Estimates One and Two is more apparent than real. The author of Estimate Two has considered that he was justified in assuming that practically the whole area which could be cropped in wheat in any one year would be so cropped; and that, therefore, it was not necessary to make a deduction from the area for other crops. These might, indeed, be grown upon land, which would otherwise lie fallow. There is, however, a real discrepancy between the results of the two first estimates and those of Estimate Three. It will be seen from the above table that the discrepancy occurs especially in regard to the relative estimates as to the area of land susceptible of cultivation in the North-West Territories. Dr. Saunders' estimate is approximately double the larger of the others. This arises largely from his having taken a much more sanguine view of the wheat-producing capacity of the semi-arid area than the authors of Estimates I. or II. In his estimate of the proportions suitable for cultivation, the seven-eighths estimated for Assiniboia include a large part of the semi-arid area, and in Alberta, for which two-thirds is estimated as the wheat-bearing region, the semi-arid area covers more than half the province. In Saskatchewan, where the cultivable proportion is put at three-fourths, the semi-arid area comes up for some distance, and the muskeg and mud regions towards the mouth of the Saskatchewan suggest that a further reduction is necessary. All the estimates are agreed upon the available area in Manitoba.

When one turns to Table (3) above, the discrepancies appear still more striking. Here again, however, the difference between the first and second estimates can be explained. The figure in Estimate One of 18·5 bushels as the average yield is taken from the Manitoba average for 1891–1902; the author of Estimate Two does not regard it as fair to apply the Manitoba average of these years to the whole of the North West. He regards it as unlikely that the average of the North West, exclusive of Manitoba, will exceed 15 bushels per acre for many years to come. The relatively high figure of the Third Estimate results from the application of a high average, also based upon a Manitoba average, to a high estimate of the acreage annually available for the production of wheat.

The mean yield per acre in Manitoba from 1889, when the continuous collection of statistics began, until 1902 was 18·37 bushels. It is to be observed as an important circumstance in determining the character of the mean that in 9 years out of 14 the crop was more below the average,

* Based on the mean yield per acre in Manitoba, 1891–1902, which was 18·57 bushels per acre.

† Based on the mean yield per acre in Manitoba, 1891–1902, and calculated for the estimated wheat acreage of Manitoba.

‡ Based on and calculated for estimated wheat acreage of the North-West Territories.

§ Based on the mean yield per acre in Manitoba, 1891–1900.

‖ Inferred from statement in Dr. Saunders' "Wheat Growing in Canada," page 3. "This" [812 million bushels] "would be ample to supply the home demand for 30 millions of inhabitants . . . and meet the present requirements of Great Britain three times over."

two years being greatly below the mean, and the mean being raised by the occurrence of three exceptionally good years. The effective mean, which may be regarded as the average yield of the years approaching each other, and excluding extremes, appears therefore to be obtainable by taking the years from 1892 to 1899, 7 years out of the 14, omitting 1895, which was an exceptionally high year, and which was more than off-set by the exceptionally low crop of 1900. The mean of these seven years is 16 bushels per acre. If the yield is calculated at this rate upon 22·4 million acres (the area suggested in Estimate Two as likely to be annually available for the production of wheat), the total yield would be 358·4 million bushels.

As regards the estimates given in two cases only of the quantity of wheat available for export, the figures in both cases must be regarded as purely hypothetical. The total population of Canada at the period when all the western farms come to be occupied and cultivated must necessarily be a subject for almost unguided speculation.

It may be observed that should the quantity of wheat realised be no more than the quantity available according to Estimate One, it does not appear that on this basis the quantity of wheat available from the Canadian wheat-fields would be sufficient to supply the present requirements of the British market, these requirements being about 220 million bushels.

It may be urged, however, either that the productive capacities of the wheat areas under consideration have been under-estimated by the authors of Estimate One, or that they have omitted to take account of more distant areas—*e.g.*, in Athabasca and in the District of Mackenzie—which may also turn out to be wheat producing. It may be urged also with more force that an advance in the price of wheat might bring into cultivation some land which has been left out of account in the estimate.

The authors of the several estimates hold to their respective opinions, and all are well qualified to judge. All that can be said is that the two first err perhaps on the side of too great caution, while the third errs perhaps in being over-sanguine. But, indeed, all are more or less open to criticism. Even if it were physically possible to cultivate the number of acres in question with wheat, it would still be necessary to know whether or not it would at some distant time be economically advantageous to do so, and even if it were economically advantageous, whether or not the then farmers would be inclined to devote so large a proportion of their land and of their working capital to the growth of that particular crop.

Estimate Four.

The writer has also received a diagrammatic map (*see* opposite) which shows, exclusively on the basis of the meteorological reports over the whole period of record, the estimated comparative fertility of the different areas indicated.

The areas are marked as follows:—

(*a*) In red single hatching, the area of certain wheat crop.

(*b*) In black single hatching, the area of less certainty because of late summer frosts.

(*c*) In black cross hatching, the area in which the wheat crop is uncerta[illegible] cause of deficiency of moisture.

This estimate is the result of a careful study by a very competent authority of the indications afforded by the meteorological records as disclosed in the Reports of the Meteorological Service. It does not take account of the character of the soil or of the other conditions, which must be regarded in a comprehensive view, and the author has made no attempt to calculate the probable yield from the several areas; but the map is of interest so far as it goes, and especially for purposes of comparison with the map to illustrate Estimate 1.

SKETCH MAP OF CANADA
SHOWING WHEAT AREA
TO ILLUSTRATE
ESTIMATE 2.

Red Single Hatching — *Wheat an almost certain crop.*

Black Singie Hatching — *Wheat in some years liable to injury from late summer frosts.*

Black Cross Hatching — *A region where rainfall is deficient and irrigation necessary in some years.*

Weller & Graham, Ltd Litho London.

Estimate Five.

An estimate of wheat production in the North West was made in 1902 by Mr. Hugh McKellar, Deputy Minister of Agriculture for Manitoba, and confirmed by him in a note dated July 1904. This estimate, which is given in full in Appendix C (p. 121), may be summarised as follows:—

ESTIMATE OF MR. HUGH MCKELLAR, DEPUTY MINISTER OF AGRICULTURE, MANITOBA.

	Land Area in Acres.	Land Suitable for Farming.	Alienated up till 1903.	Under Crop in 1902.	Total Broken in 1902.	Estimated Wheat Production in 1912.
	Acres.	Acres.	Acres.	Acres.	Acres.	Bushels.
Manitoba	41,002,240	23,000,000	20,000,000	3,189,015	3,689,015	168,340,000
Alberta	63,523,200	16,000,000	10,000,000	1,000,000	1,000,000	181,660,000
Assiniboia	57,177,600	19,000,000				
Saskatchewan	69,120,000	17,000,000				
Total of N.W.T.	189,820,800	52,000,000	—	—	—	—
Total	230,823,040	75,000,000	30,000,000	4,189,015	4,689,015	350,000,000

The net result of the examination of these highly competent estimates is that at present it is almost, if not altogether, impossible to discover the precise limits of cultivation, and that while there are still so much land to be cultivated and so many bushels of wheat to be grown, ere the most modest millions of these estimates are reached, debate on remoter millions is perhaps premature.

(xxiv.) THE OUTLYING REGIONS OF THE NORTH WEST.

The foregoing details relate exclusively to the Province of Manitoba and to the Territories of Alberta, Saskatchewan, and Assiniboia. These, large as they are, do not, however, comprise the whole of the country to the west. Leaving out of account the regions in the extreme north, there is immediately north of Saskatchewan, the huge territory of Athabasca. The southern portion at least of this region is probably susceptible of cultivation, if not indeed of considerable settlement. A few isolated settlements are already creeping up into that territory. It is, however, idle to speculate upon the remote future so far as to include Athabasca in a serious estimate of the immediate possibilities. Even if it were quite certain that its soil and climate would readily lend themselves to extensive production, the area is too remote from the areas already only partially developed to justify any attempt to settle it on a large scale. The distance from markets would prevent any commercial exploitation, and the isolation which would be inevitable would inflict unnecessary hardships upon the settlers and impose unnecessary administrative expenses.

Whatever, for example, may be the ultimate value of the Peace River district,* the development of it must inevitably wait for the fuller development of the nearer districts already not too thickly populated. No doubt the passion for pioneering has been a valuable element in the opening-up of the West; but there are economical limits to effective development. The existence of these extensive areas on the confines of settlement, free to all, imposes an advantageous check upon too sudden or considerable an advance in the price of land; but their actual utilisation may well be left for the future. There is so much land readily available that there is no need to go so far afield.

It is to be observed also that the attempt to distribute agricultural effort over a vast expanse has everywhere been accompanied by diminished average yield. This has notably been the case in the United States.

* *See* Report on the Peace River Region, by James M. Macoun, Geological Survey of Canada, Reports E, Ottawa, 1904. The conclusions of this report were disputed by some, but no authority of equal reputation and competence has called in question its substantial accuracy.

(xxv.)—Facilities afforded to Agricultural Exploitation.

(a) *Governmental.*

Manitoba was made a province of the Dominion in 1870, the boundaries of the original province being subsequently extended. The Provincial Government controls the public lands, and otherwise exercises the powers to which provinces are entitled under the British North America Act.* The Government of Manitoba aids agriculture principally by grants to associations—the Pure Bred Cattle Association, the Sheep and Swine Breeders' Association, the Dairy Association, &c., and by encouraging the formation of Farmers' Institutes. The North-West Territories, so far as regards public lands, colonization and the management of Indian affairs, are under the control of the Department of the Interior of the Dominion Government. They have, however, a Lieutenant-Governor and Council, and a Legislative Assembly. The Territorial Government undertakes the administration of education, and encourages agriculture by various means. Some of these are, the provision by ordinance for Hail Insurance, and the encouragement of the formation and working of agricultural societies, and live stock associations. Through these associations the Territorial Government has organised a system of importation of pure bred stock at a nominal cost to the importer, and at a small cost to the Department of Agriculture.† It also undertakes drainage on a large scale (as in central Saskatchewan, for example), gives grants for exhibitions, and for experiments in agriculture and in breeding.

The Dominion Government gives facilities for settlers in choosing their land, lends them seed grain (on the security of their homestead patents), and sometimes even lends them horses. The Department of the Interior which has the control of colonization, sometimes provides for a time farming instructors, and otherwise in an almost infinite variety of ways, aids the immigrant in establishing himself.

The Dominion Department of Agriculture aids in the establishment of creameries,‡ gives information, organises the distribution of seeds,§ and at its experimental farms at Indian Head and at Brandon, carries on experiments and offers models for farming practice.

The Department of Forestry also sends out large quantities of trees for the purpose of encouraging the growth of shelter plantations.

The effect of all of these activities is to promote mixed, or at least varied, farming, and to encourage skilful cultivation of the land in such a way as to avoid premature exhaustion of the soil, and too exclusive reliance upon one crop.

It is evident that the extension of varied and constantly improving methods makes farming at once more interesting, and, when wisely carried out, more profitable to the farmer than specialist production of wheat, or of any other individual crop.

These methods also distribute the risk, tend to avoid the total disappointment and total loss which sometimes result from exclusive devotion to a single product, and protect the land from exhaustion.

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* 30 & 31 Vict. c. 3. While this Report is passing through the press, a Bill has been introduced into the Dominion House of Commons by Sir Wilfrid Laurier, creating two new Provinces, to be called Alberta (capital, Edmonton) and Saskatchewan (capital, Regina). The new provinces will embrace the region occupied by the existing Territories of Assiniboia, Saskatchewan, Alberta, and Athabasca. The proposed dividing line is long. 110°, the Fourth Initial Meridian.

† The Canadian Pacific Railway has hitherto assisted in this by conveying such stock free, or at reduced rates.

‡ *See* p. 44.

§ The distribution of seed is a very important branch of Governmental encouragement of agriculture. About 40,000 farmers throughout Canada were supplied in 1903 with packages of seed, without cost, on request. These packages contain of oats 4 lbs., and of barley and wheat 5 lbs. each. The seed is carefully selected, and is thoroughly clean. With careful cultivation, the farmer can in two or three years have all the seed which he requires by saving the yield of the Government packages. (Report of the Minister of Agriculture, Ottawa, 1904, *p.* xxxvii.)

(b) *Financial Facilities.*

Financial facilities are afforded to the farmer in two principal ways, first, by the banks, and second, by the loan companies.

1. *The Banks.*—The Canadian banking system has turned out to be admirably adapted to the development of the North West.* Although there are a few private banks, almost all the business is done by the branches of the Canadian chartered banks, whose head offices are in Eastern Canada. These branches are established even in the less important centres, and temporary accommodation for purchase of farming implements or of seed is readily obtained by careful settlers. These accommodations are effected either by the system of overdrafts, similar to the method in use by the Scotch banks, or by the discounting of the farmers' bills. No doubt the business is a profitable one to the banks; but it is a great convenience to the farmers. The rate of interest in the North West is now about one per cent. higher than in the East of Canada; but it is understood that this is no more than sufficient to cover the additional cost of transacting business, sometimes in remote places. The important share taken by the banks in developing the country cannot be disputed. The system they adopt tends to prevent the exhaustion of the farmers through excessive prices for goods bought upon credit, and the active competition of the banks prevents the charging of exorbitant interest for loans from them.

2. *The Loan Companies.*—For other than temporary loans the farmer usually resorts to the loan companies, of which a considerable number have agencies in the North West.† During the profitable years prior to 1896, mortgages were paid off to such an extent that the loan companies found it difficult to get their funds out, and the rate of interest fell sharply. Since then the increase in immigration has enabled them to lend their funds to the new settlers.

Exact statistics of the indebtedness of the North West farmers are wanting; but all the indications go to show that in general they are not overburdened with debt, and that in those parts of the country which have been long settled there is a considerable investing class. The number of well-to-do farmers who send their children to Eastern Canada to be educated is considerable, and the growth of schools and colleges in the North West is also an evidence of the growth of a population which is increasingly comfortable in a financial sense.

* For an account of the system, *see* Walker, Byron E., "A History of Banking in Canada," Toronto, 1899.

† These loan companies have drawn their funds largely from London and Edinburgh.

V.—Population Statistics.

(i.) The Population of Manitoba and the North-West Territories.

The following Table shows the population per square mile (640 acres) of the total land area in Manitoba and the North-West Territories in the census years 1891 and 1901* :—

Province or Territory.	Population per Square Mile in	
	1891.	1901.
Manitoba	2·37	3·97
Alberta	0·25	0·65
Assiniboia	0·32	0·76
Saskatchewan	0·10	0·25
Total of the North-West Territories	0·23	0·54

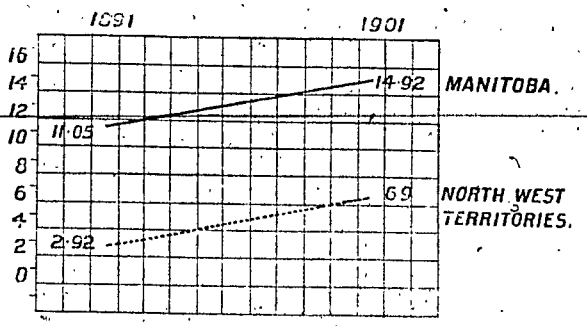
The increases of the cultivated area, and of the population in Manitoba and the North-West Territories, according to the Census Returns of 1891 and 1901, are shown in the following Table* and Diagram :—

	Manitoba.		North-West Territories.	
	1891.	1901.	1891.	1901.
Number of acres cultivated	1,232,574	2,756,106	194,947	844,020
Number of persons :—				
Rural	111,498	184,714	66,799	120,767
Urban†	41,008	70,233	—	38,173
Total	152,506	254,947	66,799	158,940
Number of persons per square mile of cultivated land :—				
Rural	57·89	43·00	219·30	91·57
Urban	21·29	16·30	—	28·59
Number of acres cultivated per 1,000 of *rural* population.	11,054	14,923	2,919	6,988
Percentage of—				
Rural persons	74·26	71·91	—	75·97
Urban persons	25·74	28·09	—	24·03
	100	100	100	100

* Calculated from data in the Census Returns, 1901.

† The urban population consists of inhabitants of cities, towns, and incorporated villages. (Instructions to Enumerators, Ottawa, 1901, *see* pp. 16 and 18). In the North-West Territories the minimum entitling a community to establishment as a village is not one of population but of the number of dwelling houses. Every community of 15 dwelling houses is entitled to be organised as a village. When such a community increases in numbers, and when the members of it desire a regular municipal organisation, this organisation may be granted by the Lieutenant-Governor in Council. There are no definite limits of population for a municipality. [Information received from the Clerk of the Executive Council, Regina.] In Manitoba the minimum of population for an incorporated city is 10,000; for a town, 1,500; and for a village, 500.

DIAGRAM showing the CULTIVATED AREA in ACRES per head of RURAL POPULATION in MANITOBA and the NORTH-WEST TERRITORIES in the two census years 1891 and 1901.



The registration of births, deaths, and marriages throughout the Dominion is very inadequately administered. The following are the statistics as given in the Statistical Year Book for 1904*:—

1902.	Births.	Deaths.	Marriages.
Manitoba - - - -	6,819	2,909	2,327
North-West Territories - -	3,952	1,558	1,094

In the rural districts there is a general immunity from infectious disease in Manitoba and the North-West Territories. Outbreaks of diphtheria occur occasionally. In 1903 an outbreak of small-pox occurred in the North-West Territories. The disease made its appearance in almost every part of the country, chiefly among the half-breed population.† Out of 208 cases, four were fatal. In the towns, however, owing to their rapid growth and the crowding together of foreign immigrants, the sanitary conditions are not good and epidemics of typhoid fever have occurred, *e.g.*, at Winnipeg.

The number of convictions for indictable offences (serious crimes) in Manitoba in 1891 was 93, and in the North-West Territories 75. In 1901 the convictions were 202 and 206 respectively, and in 1902, 223 and 272. Summary convictions (petty crimes) were in 1891 in Manitoba, 904, and in North-West Territories, 278; in 1901, 2,018 and 1,223, and in 1902, 2,049 and 1,067 respectively.‡

The tables on the next page, showing the places of origin and birthplaces of the population of the Province of Manitoba and the North-West Territories, indicate that in spite of the considerable influx of foreign immigrants during the years preceding the census year (1901), there was still a considerable preponderance of British-born settlers in the North West. In Manitoba 84 per cent. and in the North-West Territories 68·67 per cent. of the population consisted of persons born in British possessions, while the table of origins shows that in Manitoba 64·36 per cent., and in the North-West Territories 47·11 per cent., consisted of persons of English, Irish, Scotch, or other British origin, the aggregate percentage for Manitoba and the Territories together being 57·73 per cent.

During the three years since the census was taken, no doubt a change has taken place. Probably not more than 50 per cent. of the present population of Manitoba and the Territories together are of strictly British origin.

It will be observed from the table showing the relative proportion of the sexes in the North-West that the preponderance of males is greater in the more sparsely settled Territories than in Manitoba, and that this preponderance has in all the areas diminished considerably since 1891.

* Statistical Year Book, Ottawa, 1904, p. 695.

† Report of Director-General of Public Health, Sessional Paper, No. 15, Ottawa, 1904, p. 38.

‡ Statistical Year Book, Ottawa, 1904, p. 709.

TABLE showing POPULATION of MANITOBA and the NORTH-WEST TERRITORIES, enumerated according to ORIGINS with RELATIVE PERCENTAGES (Census, 1901).*

Nationality.	Manitoba.		N.-W. Territories.						Total, N.-W. Territories.		Total, Manitoba, Alberta, Assiniboia, and Saskatchewan.	
			Alberta.		Assiniboia.		Saskatchewan.					
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
English	64,542	25·29	15,504	23·59	16,835	24·98	1,614	6·26	33,953	21·36	98,495	23·78
Irish	47,418	18·58	7,595	11·53	10,150	15·06	1,052	4·10	18,797	11·83	66,215	15·99
Scotch	51,365	20·13	9,178	13·84	10,803	16·03	1,520	5·92	21,501	13·53	72,866	17·59
Other British	914	0·36	362	0·55	226	0·34	31	0·12	619	0·39	1,533	0·37
French	16,021	6·28	4,348	6·60	1,574	2·34	1,118	4·35	7,040	4·43	23,061	5·57
German	27,265	10·68	7,694	11·68	7,546	11·20	4,332	16·87	19,572	12·31	48,837	11·81
Dutch	925	0·36	361	0·55	332	0·49	21	0·08	714	0·45	1,639	0·40
Scandinavian	11,924	4·67	3,904	5·93	1,411	2·09	75	0·29	5,390	3·39	17,314	4·18
Russian	4,976	1·95	5,212	7·91	8,193	12·16	3,646	14·20	17,051	10·73	22,027	5·32
Austro-Hungarian	8,981	3·52	1,576	2·39	4,335	6·43	496	1·93	6,407	4·03	15,388	3·72
Italian	217	0·09	109	0·17	2	0·00	1	0·00	112	0·07	329	0·08
Jewish	1,514	0·59	17	0·03	197	0·29	1	0·00	215	0·14	1,729	0·42
Swiss	204	0·08	131	0·20	28	0·04	5	0·02	164	0·10	368	0·09
Belgian	940	0·37	152	0·23	141	0·21	16	0·06	309	0·19	1,249	0·30
Half-Breeds	10,371	4·06	3,686	5·60	2,115	3·14	5,834	22·72	11,635	7·32	22,006	5·41
Indian	5,906	2·31	5,620	8·53	3,213	4·77	5,836	22·73	14,669	9·23	20,575	4·97
Chinese and Japanese	210	0·08	224	0·34	62	0·09	4	0·02	290	0·18	500	0·12
Negro	61	0·02	27	0·04	9	0·01	1	0·00	37	0·02	98	0·02
Various Origins	196	0·08	23	0·03	85	0·13	20	0·08	118	0·07	314	0·08
Unspecified	1,261	0·50	153	0·23	138	0·20	56	0·22	347	0·22	1,608	0·39
	255,211	100	65,876	100	67,385	100	25,679	100	158,940	100	414,151	100

TABLE showing the NUMBERS and PERCENTAGES of the SEXES in MANITOBA and the NORTH-WEST TERRITORIES at the CENSUS PERIODS, 1891 and 1901.

		Manitoba.		N.-W. Territories.								Total, Manitoba, Alberta, Assiniboia, and Saskatchewan.	
				Alberta.		Assiniboia.		Saskatchewan.		Total, N.-W. Territories.			
		Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
1891	Males	84,842	55·30	14,649	57·95	17,184	56·58	5,793	51·96	37,626	56·33	121,968	55·62
	Females	68,164	44·70	10,628	42·05	13,188	43·42	5,357	48·04	29,173	43·67	97,337	44·38
	Total	152,506	100	25,277	100	30,372	100	11,150	100	66,799	100	219,305	100
1901	Males	138,504	54·25	36,886	55·99	37,303	55·36	13,250	51·60	87,438	55·01	225,942	54·56
	Females	116,707	45·75	28,990	44·01	30,083	44·64	12,429	48·40	71,502	44·99	188,209	45·44
	Total	255,211	100	65,876	100	67,385	100	25,679	100	158,940	100	414,151	100

* The main figures are taken from the Census Returns, 1901, Ottawa, 1902, Vol. I., pp. 286, *et seq.*

TABLE showing the PLACES of BIRTH of the POPULATION of MANITOBA and the NORTH-WEST TERRITORIES (Census 1901)* with the Percentages.

Countries.	Manitoba.		North-West Territories.		Total.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
Manitoba	99,806	39·11	5,826	3·67	105,632	25·51
North-West Territories	2,053	0·80	50,438	31·73	52,491	12·67
Unorganised Territories	—	—	—	—	—	—
British Columbia	167	0·07	233	0·15	400	0·10
New Brunswick	820	0·32	669	0·42	1,489	0·36
Nova Scotia	1,536	0·60	1,169	0·74	2,705	0·65
Ontario	67,566	26·47	28,229	17·76	95,795	23·13
Prince Edward Island	419	0·16	488	0·31	907	0·22
Quebec	8,492	3·33	4,075	2·56	12,567	30·35
Canada, not given	—	—	408	0·26	408	0·10
Total for Canada	180,859	70·87	91,535	57·59	272,394	65·77
England	20,036	7·86	10,752	6·76	30,788	7·43
Wales	356	0·14	186	0·12	542	0·13
Scotland	8,099	3·17	4,226	2 66	12,325	2·98
Ireland	4,537	1·78	2,158	1·36	6,695	1·62
Lesser Islands	65	0·03	25	0·02	90	0·02
Total for British Isles	33,093	12·97	17,347	10·91	50,440	12·18
Australia	60	0·02	48	0·03	108	0·03
India	135	0·05	117	0·07	252	0·06
Newfoundland	141	0·06	59	0·04	200	0·05
New Zealand	18	0·01	14	0·01	32	0·01
South Africa	26	0·01	—	—	26	0·01
Other Possessions	44	0·02	27	0·02	71	0·02
Total for other British Possessions	424	0·17	265	0·17	689	0·17
Total of British-born	214,376	84·00	109,147	68·67	323,523	78·12
Austria-Hungary	11,570	4·53	13,407	8·44	24,977	6·03
Belgium	790	0·40	330	0·28	1,120	0·27
China	209	0·08	277	0·17	486	0·12
Denmark	318	0·12	369	0·23	687	0·17
East Indies	14	0·01	8	0·01	22	0·05
France	1,470	0·58	1,023	0·64	2,493	0·60
Germany	2,285	0·90	2,170	1·37	4,455	1·08
Greece	3	0·00	2	0·00	5	0·00
Holland	57	0·02	53	0·03	110	0·03
Iceland	5,403	2·12	424	0·27	5,827	1·41
Italy	125	0·05	82	0·05	207	0·05
Japan	13	0·01	14	0·01	27	0·01
Norway and Sweden	1,772	0·69	2,093	1·32	3,865	0·93
Roumania	110	0·04	58	0·04	168	0·04
Russia	8,854	3·47	14,585	9·18	23,439	5·66
Spain and Portugal	16	0·01	12	0·01	28	0·01
Switzerland	134	0·05	68	0·04	202	0·05
Syria	63	0·02	14	0·01	77	0·02
Turkey	6	0·00	11	0·01	17	0·00
United States	6,922	2·71	13,877	8·73	20,799	5·02
West Indies	32	0·01	25	0·02	57	0·01
Other Countries	35	0·01	79	0·05	114	0·03
Total of Foreign-born	40,201	15·75	48,981	30·82	89,182	21·53
Born at Sea	23	0·01	28	0·02	51	0·01
Not given	611	0·24	784	0·49	1,395	0·34
Totals	255,211	100·00	158,940	100·00	414,151	100·00

* *See* Census Returns, 1901, Ottawa, 1901, Vol. I., p. 432. All percentages in the above table have been worked out by Professor de Lury of the University of Toronto.

The probabilities of future increase of population may to a certain extent be estimated by means of a comparison between the areas in the United States situated to the south of the international boundary, but otherwise not greatly dissimilar in character to the region in Canada, which is the subject of inquiry. The group of States which may not unfairly be selected for comparison forms a portion of the North Central Division—they are Minnesota, North and South Dakota, and Iowa. The aggregate area of these States is approximately the same as that of Manitoba, Alberta, Assiniboia, and Saskatchewan; both being approximately 358,000 square miles.*

The following table shows the comparative growth of population in the two groups.†

	U.S. Group.	Canadian Group.	
1840	43,112	—	—
1850	198,291	5,391	1849
1860	851,773	6,691	1856
1870	1,647,907	18,995	1870–1
1880	2,540,565	65,954	1880–1
1890	3,762,163	152,506	1890–1
1900	4,703,963	414,151	1901

A growth of the population in the North West of Canada similar to the growth in the United States group would give 2,484,000 in 1941. If the percentage of rural persons remained as it now is, the rural population would be 1,842,000‡ in 40 years from 1901; and the urban population 614,000. There is, however, an apparent tendency for the urban population to increase more rapidly than the rural. This tendency may be observed in the statistics of both groups.

The following tables give statistics for four States of the North Central Division of the United States and for that division as a whole.

The statistics are, however, not precisely comparable with those given above, since the expression "improved" land in the returns of the United States, may not involve precisely the same as the expression "cultivated" land of the Canadian census returns. Nevertheless they show in a rough way that a rather larger proportion of the population of the four States, although not of the North Central Division as a whole, is described as rural (including semi-urban) than is the case in the Canadian settled districts.

TABLE showing PERCENTAGES of RURAL (including SEMI-URBAN) POPULATION, and of URBAN POPULATION (on basis of considering as URBAN places of 4,000 INHABITANTS and upwards), in the States of NORTH and SOUTH DAKOTA, IOWA, and MINNESOTA, and in the North Central Division of the United States as a whole, during the CENSUS YEARS 1880, 1890, and 1900.§

	North Dakota.			South Dakota.			Iowa.			Minnesota.			North Central Division.		
	1880.	1890.	1900.	1880.	1890.	1900.	1880.	1890.	1900.	1880.	1890.	1900.	1880.	1890.	1900.
Percentage of Rural Population.	—	94·4	94·6	—	97·1	92·8	87·6	82·5	79·5	83·4	69·1	69·0	78·9	69·9	64·5
Percentage of Urban Population.	—	5·6	5·4	—	2·9	7·2	12·4	17·5	20·5	16·6	30·9	31·0	21·1	30·1	35·5
	—	100	100	—	100	100	100	100	100	100	100	100	100	100	100

* The exact figures are—Canadian group, 357,972 sq. miles; U.S. group, 358,565 sq. miles.

† The statistics are calculated from the Census Reports of the respective countries.

‡ This rough estimate may be compared with the estimate of the productivity of the rural population. *Cf.* infra, p. 80.

§ U.S. Census, 1900 Report, Washington, 1901, Vol. I., pp. lxxxiv.–v.

TABLE showing AREA in ACRES of "IMPROVED" LAND per 1,000 of RURAL POPULATION (including SEMI-URBAN) during the CENSUS YEAR 1900 in the States of NORTH DAKOTA, SOUTH DAKOTA, IOWA, and MINNESOTA, and in the North Central Division of the United States.*

—	North Dakota.	South Dakota.	Iowa.	Minnesota.	North Central Division.
Rural Population	301,905	372,827	1,775,374	1,269,143	16,989,701
Area in acres of "Improved" Land per 1,000.	31,283	30,271	16,848	15,252	13,085

Taken as they stand, with due precaution against attaching too much importance to the conclusion, the statistics would seem to show that the farming population of Manitoba cultivates rather a larger acreage per head than the similar population of the North Central Division of the United States as a whole; that it cultivates rather less per head than the similar population in Minnesota; and that it cultivates very much less than the population of the other three States. As regards the population of the North-West Territories, it is far behind those just mentioned, although in the decade between 1891 and 1901 the production per head was more than doubled.

(ii.) ESTIMATES OF POPULATION IN RELATION TO PRODUCTIVITY.

In connection with considerations of the physical and economic possibilities of the North West, it is important to consider what movements in population must inevitably accompany the realisation of these possibilities. It is difficult to determine with precision how many persons must necessarily be settled upon a given area, under North West conditions, in order to secure its cultivation, and it is still more difficult to determine the number of persons indispensably necessary to produce a given average crop. The problem may, however, be simplified by making certain assumptions.

Eliminating all questions of variability of harvests, together with all questions relating to possible further improvement in agriculture, as well as the consideration that progress towards the assumed point of maximum efficiency must be very gradual, the present productive capacity of Manitoba may be regarded as attainable throughout the North West.† On this basis it may be estimated that *one* permanently settled family of *five* persons, supplemented by temporarily imported assistance during harvest, is sufficient to cultivate in crops each year the equivalent of two-thirds of one quarter section (106 out of 160 acres), and that of this area 70 per cent. is annually devoted to the production of wheat. It results from this estimate that six families, or 30 persons, will cultivate one square mile of cultivated area,‡ 70 per cent. of which is in wheat. If, then, it be required to produce an average total of 50,000,000 bushels yearly at an average yield of 18·5 bushels per acre, the cultivation would require 2,702,702 acres each year in wheat, or a cultivated area of 3,861,000 acres. This cultivated area would require the services of 180,990 rural persons. As a matter of fact, 184,714 rural persons in Manitoba succeeded in producing 50,502,035 bushels of wheat in 1901. However, approximately the same number of persons produced only 13,025,252 in 1900, while a considerably larger population produced only 40,000,000 bushels in 1903.

Nevertheless, 180,000 rural persons may be provisionally regarded as the number indispensably necessary to secure (other conditions being constant) a continuous yield of 50,000,000 bushels of wheat. This yield may be

* U.S. Census, 1900 Report, Washington, 1901, Vol. I. pp. lxxxiv.-v., and Vol. V., Table 16.

† An assumption made only for the purposes of this estimate. The writer does not regard it as an assumption which could be safely made as a basis for general conclusions.

‡ In the census years Manitoba had, in 1891, 57·89, and, in 1901, 43 rural persons per square mile of cultivated area. It cannot yet be regarded as having reached a stable point.

regarded as representing the point of their maximum efficiency. The application of this result, or of any other result similarly arrived at, to estimates of productivity on the basis of physical or economical possibility is easy, but such application cannot be regarded as otherwise than highly speculative.

By way of illustration the following tables may be given :—

(1.) TABLE showing the ACTUAL YIELD of WHEAT in MANITOBA and the NORTH-WEST TERRITORIES for the years 1901, 1902, and 1903, and the Numbers of the Rural Population in 1901 (the Census Year).

Year.	Rural Population.			Total Yield of Wheat.
	Manitoba.	N.W. Territories.	Total.	
				Bushels.
1901	184,714	120,767	305,481	63,310,482
1902	*	*	—	67,034,117
1903	*	*	—	56,228,437

(2.) Hypothetical INCREASE of the Rural POPULATION which would be necessary to produce various ESTIMATES of the average YIELD of WHEAT.

Desired Average Yield of Wheat in Bushels.	Estimated Rural Population indispensably necessary to attain desired Yield.
50,000,000†	180,000
100,000,000	360,000
150,000,000	540,000
200,000,000	720,000
250,000,000‡	900,000
300,000,000	1,080,000
350,000,000§	1,260,000
400,000,000	1,440,000
800,000,000‖	2,880,000

From these figures it would appear that the present rural population of the North West,¶ even supplemented by temporary assistance,** is unlikely to be able to produce much more than 120,000,000 bushels of wheat under the present conditions of agriculture. If, however, the rural population increases by leaps and bounds, as it may, the larger figures will become capable of realisation, provided the productivity per unit of population is kept up to the estimated pitch, which is indubitably high. In order to find the total population of the area which would be likely to occupy it under various assumed conditions, it would be necessary to add from 25 per cent. and upwards for the urban population.††

The above calculations are based upon the hypothesis that the future productivity, in respect to wheat, of the rural population throughout the North West will not be less than it now is in Manitoba.‡‡ This condition

* The rural population in these years cannot be given with any approach to accuracy; 15 per cent. per annum may be added as an approximate increase.

† The yield from the labour of a rural population of 305,000 in 1901 was 63,310,532 bushels.

‡ Approximately the yield of Estimate One.

§ " " " Two.

‖ " " " Three.

¶ Estimating that roughly as not now (1904) exceeding 450,000.

** By harvest labourers going temporarily into the country. In 1903 between 8,500 and 9,000; and in 1904 only 1,100 hands are reported to have gone from Eastern Canada into Manitoba for the harvest. Information from the Department of Agriculture, Winnipeg.

†† Compare table on p. 80.

‡‡ The growth of this productivity is shown in the diagram on p. 81.

cannot be expected to be realised for many years, if it can be realised at all. The reasons for this conclusion are as follow :—

(1.) The rural population of Manitoba comprises the most experienced and successful farmers, while the bulk of the population of the North-West Territories consists of comparative newcomers. Even although some proportion of these newcomers have had farming experience elsewhere (in the United States, for example), a period of four or five years at least must elapse in each case before the point of maximum productivity is reached. In less favourable cases the period will be longer.

(2.) While the complete exhaustion of the soil under existing conditions of cropping may be long delayed, the progressive increase in the cultivation of new lands must inevitably be accompanied by the gradual exhaustion or artificial enrichment of the lands which have been long under cultivation. These movements must be reflected not only in the prices of land in districts in different stages of development, but also in the area under cultivation and in the total yield.*

(3.) While the physical productivity of the soil and the mere presence of rural population may be calculated upon to result in the production of a certain amount of wheat, the character of the new population, apart from its position on the scale of agricultural skill, must be taken into account. If, as is the case at present, a large proportion of the rural population prefers to engage in miscellaneous production for its own needs rather than in specialist production for sale, the latter involving the contingency of increased risk and necessitating the purchase from others of goods for personal consumption, the amount of specialist production (of wheat, for instance) will not be so great in the North-West Territories as in Manitoba. In Manitoba, the proximity of towns and the general conditions of an established community make for specialist production and miscellaneous purchase. In the North-West Territories the conditions now make, and for some time to come must continue to make, especially in the more recently settled districts, for miscellaneous production and the purchase of a small number of commodities not susceptible of being produced at home. It is true that this preference for a self-contained farm or village life is gradually broken down, but it is in some measure indispensable for the pioneer, and is more or less inseparable from the thrift which must be practised in order to secure stable economic conditions. In its earlier stages the colonising community must be self-contained. Moreover, the foreign European immigrants are accustomed to such a life, and cannot abandon it without certain risks, since they impute to it a moral value.

It is obvious that the quantity of wheat required for domestic consumption in Canada, and the quantity of wheat exported by Canada to countries other than Great Britain, are quite impossible to estimate for remote periods.

The net result of these inquiries in this connection is that under the most favourable circumstances which are justifiable to consider, the population of the North West would require to increase to about five times its present amount before it would be safe to infer that the North West could be relied upon to provide a quantity of wheat nearly sufficient for the requirements

* The opening up of the new lands of Manitoba from 1876–1886 drew the farmers from the older and less easily cultivated soils of Ontario. Prices of agricultural land in Ontario fell sharply; land went out of cultivation, and the total yield diminished. Although the process may not be precisely similar in the North West, the development of the Western Territories may produce upon Manitoba results approximately the same as those produced by Manitoba upon Ontario 25 years ago. These, indeed, were similar to the effects upon agriculture in Western Europe brought about by the development of altogether new wheat-growing countries.

of Great Britain, assuming the amount of these requirements to remain stationary, and assuming that Canada did not export to other countries.

Or, the result may be put in this way:—*if* the population increased to the extent indicated, *if* that population devoted itself to the production of wheat to the point of maximum efficiency, *if* nature responded to these efforts by bountiful harvests, and *if* no wheat were sent elsewhere, the North West would be in a position some years hence to furnish the market of Great Britain with about 75 per cent. of the wheat it at present imports from all countries together.

During the years which must elapse before this productivity is fully developed, production and importation of wheat in Great Britain, and the total quantity required by that country, may change considerably, and changes may also take place through the consumption in Great Britain of grains which Canada does not at present produce, or does not produce in quantities sufficient to influence the market.*

The competition of purchasers other than Great Britain in the Canadian wheat market, might also be calculated upon to influence from year to year the quantity of wheat which could be economically exported to Great Britain.

VI.—Prices in relation to Productivity.

The possibilities of the soil and climate and the productive powers of the population having been considered from the physical point of view, and from the point of view also of the rooted customs of the people, it is now necessary to examine the question of productivity from the point of view of economic advantage in the narrower sense.

It is clear that while the physical possibility of productiveness constitutes a superior limit above which production cannot go, and that while a limit inferior to this must be imposed by the numbers of the population regarded as productive units, the extent to which this limit is approached in special products will depend upon the comparative economic advantage of producing these, and upon the alertness or otherwise of the population in adjusting the direction of its labour to this economic advantage.

The field of economic advantage, or the market, may be considered under three heads; *first*, the local market; *second*, the market within the country, but external to the local market, which may be called the domestic market; and *third*, the export market.

Among the elements to be taken into account in respect to all of these, are the following:—

(1.) The suitability of the soil for different uses, and for rapid changing from one use to another—mobility of soil, in fact.
(2.) The estimate of the risk involved in exclusive cultivation of one crop.
(3.) The amount of expenditure of new capital and labour and abandonment of old capital involved in changing from one crop to another.
(4.) The estimate of the differential advantage in respect to net returns.
(5.) Personal aptitude for varied cultivation.

(i.) *The Local Market.*

Assuming, for example, that the whole of the area in question is suitable for varied cultivation, it would not be safe to infer that a rise in the market price of a particular crop would either immediately or ultimately (if the price continued to be relatively high) result in a diversion of productive power,

* Indian corn, for example.

unless the other conditions were favourable. If they were, and the diversion occurred, the market price would, *ex hypothesi*, be affected, and this consideration would, however roughly in practice, usually be taken into account, together with an estimate of possible increase on the demand side.

Thus, so long as the stream of immigrants continues, the produce required by them immediately on arrival must command relatively high prices in the localities into which they go. Oats, hay, potatoes, flour, beef, and pork, command at present in the North-West Territories prices which tend to distribute the productive powers of the farmers over these commodities, and tend also to discourage specialization (as regards the district) in any one of them.

The extensive railway construction which has been going on in the North West during recent years, has had, among other effects, the following important economic ones:—

(1.) It has drawn large numbers of men from agricultural production to railway construction. In the case of new comers without capital, this has enabled them to provide the wherewithal to establish themselves to better advantage than they could otherwise have done; but it has delayed the commencement of their agricultural productivity.

(2.) It has caused a local demand for produce both for men and animals.

(3.) It has brought into certain localities considerable resources in ready money.

(4.) These causes together have contributed to an advance of prices in the local markets of the agricultural products mentioned above.

Distances between market centres in the North West are so great, that local prices vary very much in different districts. The comparative scarcity of ready money compels people to buy from hand to mouth, and temporarily high local prices are very common. Oats sometimes go to a very high price in one season, and thus increased cultivation of oats is encouraged in the next season, provided the differential advantage likely to accrue is estimated to be great enough to justify a change in the direction of productive power, the limitations of the local market being taken more or less into account.

The influences affecting the local markets over so extensive and diversified an area as that of the North West, are thus frequently important enough to neutralize the influences upon these markets of external prices. Moreover, produce is frequently imported into the area of these markets from great distances, and in considerable quantities, not because it cannot on physical grounds be produced there, but because the diversion of productive powers has not been regarded as being economically advantageous.*

The newer immigrants suffer from defective knowledge of the English language, and also because customary prices in Europe often vary widely from the current prices in the Canadian market. Thus recently established farmers sometimes demand, in broken English, prices for produce which are with some reason regarded by the townspeople as extortionate; while on the other hand the less scrupulous of the traders in the towns are able to secure excessive prices for manufactured goods from newcomers unaccustomed to the Canadian scale of prices.† These practices are inevitable concomitants of rapid growth and rudimentary commercial development. They result in obscure changes in the incidence of production which need not be followed in detail.

There are small mills in different parts of the country in which usually an inferior quality of wheat is ground for local consumption. The existence of these local mills is important in respect that they utilize wheat which has

*An example of this is to be found in the importation of hogs from Ontario and from the United States into Alberta, where they are packed in the pork packeries and re-exported.

†English settlers sometimes complain of practices of this kind, while the Canadian town people in the North West complain of the high prices exacted by Galicians and Doukhobors for potatoes, for example.

been injured by frost or by rust, and which otherwise would be valueless, and their demand constitutes an appreciable element in the local market.

(ii.) *The Domestic Market.*

The domestic market, within the country but external to the local market, may be regarded, so far as *wheat* is concerned, as comprising the demand for the mills; so far as *oats* are concerned the demand for horses used principally for railway construction purposes, and the demand for the factories, chiefly in Ontario, in which cereal products are manufactured; and so far as *barley* is concerned, the demand for feeding purposes and for distilleries and breweries.

In Ontario, wheat (fall) is grown almost entirely for the domestic market. When there is a deficiency in the wheat crop in that province, the mills and cereal factories in Eastern Canada must procure wheat from the North West. Under these circumstances the domestic price may be high enough not only to check exports of wheat but to prevent them. Such a contingency would occur, should the prices in the export market be low throughout the season on account of relatively abundant crops in other grain-producing regions.

In 1904 this contingency has actually occurred. The wheat crop in Ontario has been a failure* and an unusual amount of wheat has had to be brought into Ontario for consumption. Simultaneously the external price in the European market has been low, and exports to Europe have been prevented except those of inferior qualities of wheat. Exports have also taken place to some extent to the United States because there prices have been relatively high.

(iii.) *The Export Market.*

The influence of prices in the export market upon production is more obvious and more potent in the highly organised portions of the North West than in the less highly organised. The commodities whose prices are exposed most conspicuously to external fluctuations, are, of course, those whose export quantities bear the largest proportion to the total quantities produced.

The oscillations of productive power between wheat production and mixed farming thus depend to a considerable extent, although not exclusively, upon the export market.

For example, in 1894, "mixed farming was stimulated by the low price of wheat" in the preceding year, and large quantities of cattle, sheep, and hogs, were transported eastwards.† Again, in 1895 there was an immense crop,‡ the price of wheat was low, and it was difficult to get it out of the country.§

In the following year (1896), although many new settlers had established themselves, the area under wheat was less than that of the previous year

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* The average production of fall wheat in Ontario for 23 years, 1882–1904, was 17,996,197 bushels at 20·3 bushels per acre. In 1903 the production was 17,242,763 bushels at 25·9 bushels per acre; in 1904 the production was 9,160,623 at 15·1 bushels per acre. Spring wheat suffered a similar diminution. (Ontario Bureau of Industries, Crop Bulletin, 87, Toronto, 1904, p. 5.)

† The quantities of these products were nearly twice as great in 1894 as they were in 1893. Annual Reports for 1894, Canadian Pacific Railway, Montreal, 1895, p. 18.

‡ *See* Table showing yield of crops in Manitoba, *supra*, p. 61.

§ In consequence of the scarcity of available shipping tonnage on the Great Lakes due to the demand for that tonnage for transportation of iron ore for the United States, Eighth Annual Report, Winnipeg Grain and Produce Exchange, Winnipeg, 1896, p. 7.

by about 12 per cent., while there was an increase in the production of live stock and dairy products.*

The effect of a low export price in the customary market may, however, be neutralised, as has been the case in 1904, by the emergence of new sources of demand—in this case in the United States, and to a greater extent in Ontario. Had these new sources of demand not arisen, it is probable that a check to the production of wheat would have resulted, and that a less acreage would have been sown in wheat in the following year, than would otherwise have been the case.

The extent to which governmental action facilitates this diversion of productive power is noticed elsewhere, as is also the current practice in regard to the marketing and transportation of wheat.

Up till the present year Great Britain has offered by far the largest market for Canadian wheat,† but this year the United States has appeared as a probable competitor in the future, not with Canada in the sale of wheat, but with Great Britain in the purchase of it. The increase in the practice of mixed farming in the United States, and the comparatively small extent to which the agricultural population appears to have been recruited by recent immigration, may be regarded as accounting for the absence of expansion in the area of wheat under crop. This situation has resulted in the likelihood of the United States becoming, at least for the time being, an importer rather than an exporter, and in Chicago prices being higher than Liverpool prices.

The effect upon the Canadian wheat market has been very evident during the autumn of 1904, although exact details are not yet forthcoming.

The possibility of the United States becoming a large permanent importer of wheat is difficult to estimate. The increase in wheat prices which must occur before importation could take place on a large scale may be checked by increased wheat production, resulting partly from extension of the area under wheat, and partly from improved methods of cultivation.‡

The relative scarcity of wheat in the United States has, no doubt, been enhanced by the growth of wheat and flour shipments from that country to the East, especially to Japan.§

The possibility of a similar market opening up for Canadian wheat is by no means remote.

One of the immediate effects of the sudden advance in the price of wheat in 1904, due to the causes indicated above, has been that the practice always more or less common of the farmer speculating in his own wheat, has for the time become almost universal. Nearly the whole of the wheat held in the terminal elevators belonging to the railway companies at Fort William and Port Arthur, at the close of the season of navigation in 1904,‖ was held on account of the farmers who had borrowed from the banks a sufficient amount to enable them to hold it.

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* Winnipeg Board of Trade Annual Report, 1897, p. 18.

† *See* Tables showing quantity, value, and destinations of Wheat Exports, pp. 111–112.

‡ The agricultural experts of the United States are agreed upon the question of the need of improvement in this direction.

§ *See* the very interesting address by Mr. J. J. Hill, at Minneapolis, January 13th, 1904, St. Paul Globe, January 14th, 1904.

‖ About 1,000,000 bushels, an unusually small quantity.

VII.—Transportation.

(i.) Introduction.

While the commerce of the North West consisted almost exclusively in furs and in supplies for the Indian and half-breed hunters and trappers, organised transportation in so far as it existed was in the hands of the Hudson's Bay Company. Every year, for about two hundred years, a Hudson's Bay ship has sailed from London, made its way through Hudson's Straits as soon as the ice permitted, and crossed Hudson's Bay to York Factory, where it was discharged of its cargo of supplies, and loaded with a cargo of furs, escaping through the straits before the ice barred its passage.*

This service is now performed by a steamer, while a sailing vessel makes a similar journey to Moose Factory on James Bay.

Every year also, although this service began at a much later date, the Hudson's Bay brigade of Red River carts left Winnipeg for the south—in later years driving only to St. Paul, in the State of Minnesota, to which city the railway system of the United States was extended about 1872. While these were the only means of transporting goods in quantity to the North West, internal transportation was organised up to a certain point by the Hudson's Bay Company, whose canoes, boats, and later whose steamers, navigated the waters of Lake Winnipeg and of the Red, Saskatchewan, Athabasca, and McKenzie rivers, in summer, and whose "dog trains" traversed the whole country in winter. Hudson's Bay furs and supplies were also "freighted" by "freighters," chiefly Indians and half-breeds (French and Scotch "métis"), whose carts may still be seen sometimes in long lines crossing the more northerly prairies, where there is as yet no railway communication.

(ii.) Roads.

The immense extent of country over which the population of the North West is somewhat thinly scattered renders it almost impossible for roads to be constructed, excepting for short distances in the important centres. In fact, to build a road, owing to the infrequency of the occurrence of good road-making material, is almost as expensive an enterprise as to build a railway. So long as the distances intervening between settlements consisted of open prairie, the trails even in the spring were more or less tolerable because they spread out over the plains, but now that the land is being enclosed and occupied, the road allowances are defined. They run in long straight lines east and west or north and south. In the depressions which inevitably occur the snow lies and melts in the spring making a morass through which progress is difficult or impossible. In Southern Manitoba the roads dry with comparative rapidity and become hard and good early in the season excepting where floods have scoured them; but in the northern parts of the Province and in the Territories, the roads are impassable sometimes until May or even June. In fact it is only when the autumn frosts harden the surface that the northern roads are really good. Under these circumstances all haulage that is not absolutely urgent is delayed until the late autumn or early winter.

The North-West Territories are being rapidly divided into road improvement districts, and the settlers in those districts are taxed for the maintenance of the roads. They perform the necessary labour, and receive an allowance in proportion to the work done. Bridges are sometimes built by the settlers themselves, sometimes at the cost of the Territorial and sometimes at the cost of the Dominion Government. As settlement extends into remoter districts, expenses on this account must increase considerably. It is quite obvious that access must be obtained to the railway lines by improved roads, otherwise the benefit of these will be largely discounted.†

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* For an early account of the Hudson Bay trade, *see*, e.g., "The Geography of Hudson Bay," by Captain Coates (Hudson Bay Captain from 1727 till 1751), Hakluyt Society. For later Hudson Bay navigation, *see* p. 101.

† For the effect of the inferiority of the roads upon the marketing of crops, *see* p. 102.

The great difficulties are the immensity of the distances, the scarcity of gravel or other road material, the frequent occurrence of floods and heavy rains, the scantiness of the population, and the consequent heavy cost to the settlers of all local improvements.

(iii.) Railway Administration and Railway Systems.

The governmental administration of railway affairs was, for some years, vested partly in the Railway Committee of the Privy Council, and partly in the Ministry of Railways and Canals. In 1903, under a new Railway Act,* the former body was abolished, and its functions transferred to the Board of Railway Commissioners for Canada. This Board consists of three members, appointed by the Governor in Council. The members are appointed for 10 years; but they cease to hold office at the age of 75 years, and they may be removed at any time for cause.† The Commissioners are prohibited from being interested in any railway securities or railway appliances.

Complaints may be made to the Board that a railway company has failed in any respect to comply with the provisions of the law in General or Special Acts. The Board is a Court of Record, and has the power of enforcing its decisions. The Board may also inquire into any matters arising under the Railway Acts, either of its own motion, or upon the request of the Minister of Railways. The Board may make regulations, (*a*) limiting speed; (*b*) with respect to the safety of passengers and employés; and (*c*) protection of the forests from fire along railway lines.

The Board has the right to "provide" penalties (not exceeding $100 for each offence), which may be recovered on summary conviction.

The present total length of lines between Lake Superior and Donald (Selkirk Mountains) is as follows (single track):—

Canadian Pacific Railway (including leased lines) -	4,247·3
Canadian Northern Railway (including leased lines) -	1,579·0
Total - - - - -	5826·3

This represents the mileage in Manitoba and the North-West Territories to the outlet of the lines at Lake Superior.

(*a.*) *The Canadian Pacific Railway.*—The first exploratory survey of the country, with the definite object of determining the general direction of a trans-continental railway, was undertaken by Mr. (now Sir Sandford) Fleming, in July 1872.‡ It was intended, up till about 1878, that a trans-continental railway line should traverse the central region from Selkirk (a few miles north of Winnipeg) obliquely north-westward to the Swan River Valley (N. lat. 52°), thence westward between lat. 52° and lat. 53° by Edmonton to the Yellow Head Pass, in the Rocky Mountains, and from that point by one or other of three routes to the Pacific Coast.§

This line was to be constructed by the Government, as one of the conditions of confederation. Subsequent discussion led to additional surveys farther south, and ultimately the route which is now the main line of the Canadian Pacific Railway was adopted. This route lies about two degrees farther south than the route above described, and traverses the woodless plains instead of the broken and wooded country of the earlier surveys. It is important to notice that during the few past years, the Canadian Pacific Railway has been constructing a branch line in the general direction of the originally projected route, and that the Canadian Northern Railway has also followed its general direction, while the projected Grand Trunk Pacific Railway is intended to follow it, so far as its extreme western extension is concerned.‖

The selection of the main route of the first railway line through the central region had an immensely important influence in determining the

* The Railway Act. 3 Edw. VII. ch. 58, secs. 8–25.

† The Chief Commissioner receives a salary of $10,000 (2,100*l.*), and the other two commissioners receive each $8,000 (1,680*l.*). The present Chief Commissioner was formerly Chief Justice of Manitoba.

‡ A preliminary reconnaissance had been made in 1871. An exploration had, however, been previously made by Captain Palliser in 1857.

§ Survey and preliminary operations on the Canadian Pacific Railway, by Sandford Fleming, Engineer in-Chief, Ottawa, 1877, *passim*.

‖ *See* p. 95.

direction of the development of the country. While the fertile portions of Southern Manitoba were inevitably to be developed by means of numerous branch lines, it was evident that the direction of the main line would determine the course of development as regards the western central region. The problem was a very complex one. The through line from coast to coast, for political and military reasons must be as short as possible; for military reasons it must not be too near the international boundary; for engineering reasons it must pass through a country where construction was not exceptionally difficult; while for commercial reasons it must, if possible, traverse a portion of the country where local development was not likely to be unduly retarded by the absence of population or of immediate resources.

The southern region was not at the time known to be fertile, while the northern region, including the valleys of the Saskatchewans, was undoubtedly fertile. The southern region was practically unpopulated, while considerable settlements existed in the northern region in spite of the difficulties of access. On the other hand, the flat prairie of the southern route promised lower construction costs than the deep valleys and broad rivers which must be encountered in the northern route.

The balance of advantage seemed to lie in favour of the southern plains, and the rich valleys of the Saskatchewan, Battle and other rivers have had to wait for 20 years for railway communication, saving for the tapping of their resources at Prince Albert and Edmonton by branches from the main line.

The main line of the Canadian Pacific Railway was in part constructed by the Canadian Government; but the difficulty of completing it appeared to be insuperable and after long negotiation the portion of the line which had been constructed was handed over to a joint stock company which bound itself to complete it.

In addition to the partially constructed railway, the Canadian Pacific Railway Company was endowed with 25,000,000 acres of land to be selected from the lands traversed by the line, and with $25,000,000 (approximately 5,250,000*l.*).

TABLE showing the GROWTH of the CANADIAN PACIFIC RAILWAY COMPANY. STATISTICS of the Years 1884, 1894, and 1904.*

—	1884.	1894.	1904.
Total mileage in all Divisions	3,994·6	7,178·0	11,321·6
Mileage of Central and Western Divisions (Lake Superior to Donald, Selkirk Mountains).	1,910·7	3,609·2	4,247·3
Passengers carried	1,171,851	3,009,015	6,251,471
Freight in tons	—	3,891,804	11,135,896
Passenger train earnings per train mile.	—	$1·01	$1·40
Freight earnings per train mile	—	$1·60	$1·85
Expenses per traffic train mile	—	$0·917	—
Realised from sales of land	—	$159,631	$3,807,248
Total sales of land in acres	798,584	49,467	928,854
Average price per acre	$3·0175	$3·2300	$4·10
Total agricultural land owned by Company in Manitoba and N.W. Territories, in acres.	21,399,737	17,273,039	11,338,350

The statistical tables convey some idea of the growth of the railway. The first ten years were years of very slow development. The slender increase of the passenger traffic in spite of the great increase in the mileage is sufficiently accounted for by the scanty population, and the comparatively

* Compiled from the Annual Reports of the Canadian Pacific Railway Company.

small amount of production. During these years the railway company was compelled to exert itself strenuously in order "to make grease for its wheels." Traffic had to be made. The officials of the Company established on their own account or on account of the Company, or encouraged the establishment by others, of trading centres, flour mills, lumber mills, &c. Inducements to immigrants and inducements to investors were necessary to give the country a start. It is true that the pioneers, or some of them, have suffered, but a beginning had been made, and when the stream of immigration came the machinery for dealing with it was already in working order. The policy of the Railway Company has been to build, or encourage the building, of feeding lines, leasing or purchasing these when built by independent companies. In Southern Manitoba this has been carried so far that there is no need for a farmer to establish himself more than 15 miles from a railway line; but in the North-West Territories there are still many districts in which it will be necessary in the future to project branch lines in order to facilitate their settlement, and afford means for the exportation of their surplus products.

(b.) *The Canadian Northern Railway.*—In 1895, Messrs. Mackenzie and Mann began to construct a line known as the Dauphin and Lake Manitoba Railway. This line commenced at Gladstone, a station on the then Manitoba and North Western Railway (now a branch of the Canadian Pacific), and extended northwards to and along the east side of Lake Manitoba. This line opened up a district new to railway enterprise. The Galician settlers who began to come in 1895, and who came in considerable numbers in 1896, when the construction of the line was pushed northwards, were employed largely upon the works, and numbers of them ultimately settled along the route. These and other settlers from other parts of Manitoba and from Eastern Canada, rapidly built up a population even in advance of the line. Another impetus to the northward extension of the railway was given by the Manitoba Government. This Government gave a grant payable in the form of an annual subvention, the amount of which depended upon the distance to which the line extended in the direction of Hudson Bay, the intention being to build a line ultimately to York Factory, at the mouth of the Nelson River.*

During the years succeeding 1896, Messrs. Mackenzie and Mann enlarged their designs; they built a new line from Gladstone to Winnipeg and another from Winnipeg to Port Arthur, building also feeding lines and acquiring from the Manitoba Government a lease of the former Great Northern Railway from Winnipeg to the International Boundary, a line which had been purchased by the Government. The Dauphin line has also been extended in two divisions, and the whole system re-entitled the Canadian Northern Railway. It is expressly intended to carry within the next few years, the line westwards to Edmonton *vid* Battleford, and probably later through some pass in the Rocky Mountains to the Pacific coast. This line adopts for a considerable part of its western extension the so-called Mackenzie route,† the route originally surveyed for the main line of the Canadian Pacific Railway. It passes along the rich valley of the North Saskatchewan, and opens up an exceedingly fertile district.

At present the Canadian Northern has no extensions east of Port Arthur. For a short distance between the latter point and Winnipeg it passes through the north of the State of Minnesota. It serves indeed, in that part as the only railway communication for the district through which it passes.

(c.) *The Grand Trunk Pacific Railway Agreement.*—The agreement between the Dominion Government and the Grand Trunk Pacific Railway Company involves the construction by the Government of a new line from Winnipeg

* *See* p. 101.
† Called after the late Alexander Mackenzie, Premier of Canada, 1873–78.

to Moncton, in New Brunswick, where it joins the Intercolonial Railway (an existing Government line). The new line is intended to pass by a route from Winnipeg to Montreal parallel to the existing Canadian Pacific line, and at a mean distance north of it of about 100 miles, and thence *viâ* Quebec by a new route near the International Boundary to Moncton. The route has not yet been fully surveyed, but the distance by it between Winnipeg and Quebec is intended to be considerably shorter than the distance by existing lines, and the gradients (called grades in America) are intended to be easier. This line when constructed by the Government will be leased to the Grand Trunk Pacific Railway Company for a period of 50 years, the payment of rent to begin 10 years after construction. On the other hand, the Grand Trunk Pacific Railway Company undertakes to build a line from Winnipeg to the Pacific coast.*

Branch lines are also projected by the same Company connecting the main line with Montreal, North Bay, Port-Arthur, Regina, Calgary, and Prince Albert. The line will thus pass through the district lying between the main line of the Canadian Pacific Railway and the main line of the Canadian Northern, nearer the former in the eastern portion and nearer the latter in the western portion.†

The Grand Trunk Railway Company has at present an elevator capacity at the ports in Lake Huron and Georgian Bay in Ontario, of 5,000,000 bushels.

The plans in connection with the Grand Trunk Pacific involve an addition to the rolling stock of the combined Companies (the Grand Trunk and the Grand Trunk Pacific) of rolling stock to the value of $20,000,000 (4,000,000*l*).

The project of a new trans-continental line to be constructed in connection with the Grand Trunk Railway was first brought forward in November 1902. Since then it has occupied a large share of public attention, and it was made an issue in the Dominion elections in November 1904.

The principal points in the controversy need not be more than indicated. There seemed to be general agreement that additional railways should be built in order to accommodate the growing traffic of the North West. While, however, it appeared to some that the extensions projected by the Canadian Pacific Railway and by the Canadian Northern were likely to suffice for the needs of the country for some time to come, to others it seemed indispensable that fresh means should be provided for affording access to the West, as well as more numerous lines within its area.

The Grand Trunk Railway had not hitherto appeared as a competitor for western traffic, excepting in transporting from the eastern ports on the great lakes, its most westerly railway connection being North Bay, on Lake Huron. Advantage was taken by this railway of the apparent demand for a new line, and they aproached the Government for aid in constructing one to connect their eastern system with the Pacific coast. This line would have extended from North Bay westwards, along the north shore of Lake Superior, probably nearly parallel to the existing line of the Canadian Pacific.

The Dominion Government, however, rejected this proposal. They seemed to fear that the result would be that the Grand Trunk Railway would find its interest in shipping the western traffic from Portland, Maine, U.S.A., where already it has shipping connections, instead of from a Canadian

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* The principal documents in connection with the Agreement between the Dominion Government and the Grand Trunk Pacific Railway Company are as follows:—

1. An Act respecting the construction of a National Trans-continental Railway. 3 Edw. VII. c. 71 (Dominion Parliament) [Assented to 24th October, 1903]. This Act contains the original Agreement.

2. Supplemental Agreement between His Majesty the King and the Grand Trunk Pacific Railway Company. 3 Edw. VII. Sessional Paper No. 37A., 1904.

3. Proposed alterations to Contract *re* Grand Trunk Pacific Railway Company, and correspondence in connection therewith. 3 Edw. VII. Sessional Paper No. 37A., 1904.

4. The Railway Act, 1903, Chapter 58, is a general Act affecting all railways.

5. The debates in the Canadian Hansard show the course of the Bills through Parliament. Important discussions took place on 30th March and 5th April, 1904.

† For the general direction of the projected line (through the North-West) *see* Map showing lines of Railway (Map V. at end of volume).

port. The Government, therefore, insisted that the new line, if aided at all, should be built from the west to Quebec, with connections to the Maritime Provinces, so that summer and winter an all-Canadian route might be provided.

After prolonged negotiations an agreement was drawn up, which, with subsequent amendments, involved the formation of a new company, to be called the Grand Trunk Pacific Railway. The principal points in the agreement are indicated above.

The controversy which ensued in the Dominion Parliament, on the platform, and in the press, waged chiefly over the terms of the contract and upon the question whether, since the Government proposed to do so much, it should not go farther and construct the line from east to west, and operate it as a Government line, completing in effect the Intercolonial Railway, which, from the beginning, has been owned and operated by the Government. The Opposition began by merely criticising the terms of the contract, and, at a later stage, proposed that the line should be constructed and managed wholly by the Government.* The large majority, derived from the Province of Quebec and from the Maritime Provinces by which the Government was returned to power in November 1904, seemed to give them a mandate to carry out the contract as they proposed.

While it would be inappropriate to discuss the political aspects of the project, certain economic objections and explanations emerged in the course of the discussion, which may be noticed. It was asked, for example, whether the need for a new line from Winnipeg to Montreal or Quebec being admitted, there was any urgency for a third line from Montreal to the Maritime Provinces.† It was also asked why a line should be built by the Government, which must compete with, and perhaps injure seriously, the existing Government line, the Intercolonial. It was held that since the Intercolonial Railway had involved a loss to the Government, this loss would be greatly aggravated by the carrying out of the new project. The answer to these objections was, in effect, that the building of a line by the Government which should secure an all-Canadian route, and the leasing of this on favourable terms to the Grand Trunk Pacific, formed a more justifiable method of aiding the Company to construct its western lines than a cash subsidy, land grant, or exemption to a certain extent from taxation, all of which means had been employed in aiding the Canadian Pacific Railway. It was also held that unless such a route was provided, the Grand Trunk traffic from the west must inevitably, in so far as it was intended for exportation, go by a port in the United States, and that the end to be gained justified the cost of it.

As regards the line from Quebec to Winnipeg, it was held on the part of the Government that the gradients would be more favourable, and that it would open up a country hitherto untouched, some portions of which at least were understood to be of value. To the objection that little was known of this region, it was answered that surveys were in progress.

On the question of the need for the western extension, which was to be built by the Grand Trunk Pacific Company, it was held that during the seven or eight years which must be consumed in building the line, the growth of the country might be expected to be great enough to justify the development of railway facilities, and that this growth would be promoted by the construction of the railway. The case of the Northern Pacific Railway was quoted to show that a country supposed to be valueless might become of immense value through the development of railways.

On the controversy as a whole it may be observed that a railway in a new country undoubtedly creates traffic; the sole question is whether it is

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*. The leader of the Opposition (Mr. Borden) also proposed that the lines between Winnipeg and Fort William, on Lake Superior (the Canadian Pacific and Canadian Northern), should be improved by the assistance of the Government, and that the Grand Trunk Railway should be given running powers over them.

†. The two existing lines being the Intercolonial and the Canadian Pacific short line through Maine, U.S.A.

likely to do so with sufficient rapidity and to a sufficient extent to avoid disproportionate burdens upon the community while it is creating the traffic. Such burdens may either be in the form of the maintenance of unduly high rates, or in the confusion and widespread loss which would occur should the railway finances suffer collapse.

It is also to be pointed out that the success of the railway, both immediate and ultimate, must depend upon the continuance of conditions of trade which have indeed, to a certain extent, already during recent years been interrupted. Should the bulk of the wheat of the North West find a market in the United States, the new line must necessarily suffer. On the other hand, should trade with Great Britain and with Europe develope, such conditions would make for its success.

It may be pointed out that the region through which the new line must pass between Montreal and Winnipeg is not only destitute of coal but is at a great distance from any convenient means of coal supply by water.* The Canadian Pacific Railway line along the north shore of Lake Superior has its disadvantages in respect of gradients, which are of course susceptible of improvement; but it has the very great advantage of frequent facilities along the route for securing an ample and inexpensive supply of coal at North Bay, Sudbury, and Jack Fish Bay for example. The necessity of transporting its fuel for 100 to 500 miles from a port to the points at which it must be kept in reserve will constitute a serious item in the working expenses of the new line.

(d.) *Railway Rates.*—During past years there has been a considerable amount of grumbling about railway rates.† The situation in the west has however been relieved as the development of the country has become more rapid. This relief has been ascribed to the competition of the Canadian Northern Railway‡ with the Canadian Pacific Railway. While there may be a certain amount of truth in this presentation the main fact was that the development of the country had rendered inevitable a reduction of rates. The population and the traffic had alike increased to a point at which the rates might, without a diminution of revenue, even with an increase of it, be materially reduced. In their agitations against the railway company the traders laid great stress upon the argument that the line had been heavily subsidised and that it had a quasi-monopoly. The recent concessions seem to have resulted in the general impression obtaining, in the eastern portion of the North West at all events, that rates are now very reasonable. There is indeed no doubt that the railway rates in Canada are on the whole lower than similar rates in the United States. This is very amply acknowledged by the traders.§

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* This important fact has been pointed out to me by an expert in coal supply for railway purposes.

† A Transportation Commission was appointed by the Government in 1903. It has held inquiries at various places from time to time for the purpose of investigating complaints regarding rates. This Commission is distinct from the Railway Commission noted above.

‡ As may be gathered, for example, from the following:—"Probably the most important event "in the matter of transportation that occurred during the year was the reduction made by the "Canadian Pacific Railway Company of 3 cents per 100 lbs. on the wheat rates to the Lake front "from all Manitoba points, and 2 cents per 100 lbs. from points in the North-West Territories. "As is well known, there was a difference of 2 cents per 100 lbs. during the years 1901-1902, and "a part of the season of 1903 a difference of 4 cents, between the rates charged by the Canadian "Pacific Railway and the Canadian Northern Railway. Shippers at stations served by the latter "were having their wheat hauled to Port Arthur at the lower rates. It is matter of sincere con- "gratulation that the Canadian Pacific Railway Company followed with a reduction in their freight "tariff to correspond with the tariff of the Canadian Northern Railway, thus removing all cause "of dissatisfaction from shippers who had to use the Canadian Pacific Railway lines."—Mr. G. R. Crowe, President, Winnipeg Board of Trade, 25th Annual Report, 1904, p. xviii.

§ As in the following, for example:—"The farmer in the Canadian North West has his wheat "carried to lake ports for 2 cents per bushel less than his neighbour directly to the south, in the "States of North Dakota and Minnesota, and this notwithstanding the fact that the distance from "the Canadian North West to Fort William is greater than from these States to Duluth. As a "matter of fact, a comparison of the rates in accordance with the distance that the grain is hauled "shows that the Canadian railways are receiving for transporting the same distance a rate of from "5 to 10 cents per 100 lbs. less than the railways in Minnesota and Dakota impose. This smaller "cost for moving his produce, as above referred to, is a decided preference to the Manitoba "farmer."—Mr G. R. Crowe, President, Winnipeg Board of Trade, 25th Annual Report, 1904, p. xviii.

At present Canadian wheat and flour are exported principally by Atlantic ports to Europe; but the development of trade with the East, principally Japan, and with the Australasian Colonies is expanding rapidly. The opening of the Panama Canal is also looked forward to as a means of shipping, both outward and inward, from the plains of the extreme West as well as from British Columbia. Even now a considerable quantity of the imports into the western prairies, the Calgary and Edmonton districts, for example, are brought viâ Cape Horn and Vancouver.* The rates of freight on such goods will doubtless be reduced when the Panama Canal is opened, and some wheat may find its way to Europe by this route.†

(iv.) Internal Waterways.

River, Lake, and Canal Transportation.

Lakes Superior, Huron, Erie, and Ontario, the first two, and the last two being connected by canals, and the second and third being connected by a river, afford a great inland system of water transportation which unfortunately is available only in summer. In winter all the ports are blocked with lake shore ice, which renders navigation impossible from the end of the first week in December until about the fourth week in April, the more north-westerly harbours being the last to become clear of ice.‡

During the short summer, while navigation is open, an immense number of steamers and sailing vessels ply upon the lakes. The tonnage of ships belonging to the members of the Lake Carriers' Association, which comprises practically all the tonnage of the lakes, is 1,014,066 tons register in 640 vessels.§

By far the larger tonnage is registered at the port of Cleveland, Ohio. Several new Canadian vessels have been put upon the lake service within the past two years.

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* The Winnipeg merchants have been feeling the competition of the Vancouver merchants in connection with these imports so much as to protest to the Canadian Pacific Railway Company against the encroachment upon what they regard as their "legitimate territory" which this importation involves; they demand that the railway rates between Winnipeg and Edmonton, for example, be fixed in relation to the rate from London to Edmonton *viâ* Cape Horn and Vancouver in such a way as to enable them to compete. Report, Winnipeg Board of Trade, 1904, p. 83.

† The following information, in connection with grain rates, may be relied upon as being approximately correct:—

Average rate on wheat in cents per bushel, Fort William to Montreal (all water), season St. Lawrence navigation 1904.

May	5	cents.
June	4¾	"
July	3¾	"
August	3	" (a part cargo was carried at 2¾).
September	3½	"
October	4⅜	"
November	5	"

Average rate on wheat in cents per bushel, Fort William to Montreal (lake and rail), season St. Lawrence navigation 1904.

May	5¼	cents.
June	5⅜	"
July	4½	"
August	5	"
September	5½	"
October	6	"
November	7	"
December	9	"

Average rate on wheat, Fort William to West St. John, winter season.
20 cents per 100 lbs. 12 cents per bushel.

‡ The following notes are extracted from the weekly Ice Reports of the Lakes, issued by the Weather Bureau, U. S. Department of Agriculture.

March 8th, 1904, Lake Superior:—Duluth Lake, ice 30 inches; Grand Marais, Mich., solid ice field 22 inches extends from nine miles west to 20 miles east.

Lake Huron. Harbour ice, 22 to 30 inches thick, Lake St. Clair and Detroit River. The ice has moved out of the lower end of the lake during the week.

March 15th, No material change.

" 22nd, " "

April 26th.—Reports indicate that the ice is softening up over Lake Superior, but the fields are very extensive over western and eastern portions.

Lake Superior—Duluth—Harbour ice going rapidly.

Lake Ontario—Navigation opened on 20th April.

§ The tonnage of all descriptions of vessels is stated together, an obviously inaccurate method.

The navigation is estimated to close on the 5th December.* Insurance is more than doubled after 30th November, for five days. After 5th December, insurance cannot be effected at all.† Some of the lights are extinguished on the 5th, and, as a rule by the 6th or 7th, the last vessel of the season has passed through the canal at Sault Ste. Marie, which connects Lake Superior with Lake Huron.‡ The lake vessels in the Canadian trade convey their cargoes either to ports on Lake Huron, including Georgian Bay, or they proceed by the St. Clair River to Lake Erie, where they land their wheat chiefly at Buffalo, or further viâ the Welland Canal to Toronto or Kingston on Lake Ontario, or still further viâ the River St. Lawrence and the Lachine Canal to Montreal. When the vessels discharge their cargoes at the Lake Huron ports, these cargoes are transferred to elevators, and from thence to cars by which they are transported to Montreal, Portland (Maine), or to Boston, (Massachusetts). Thence the wheat is shipped to European ports. It is, of course, transported in bond across the portion of the United States which intervenes between Canada and Portland.

A considerable quantity of wheat from United States ports, Duluth and Chicago principally, destined for consumption in the United States or for export, is shipped to Depôt Harbour in Georgian Bay, and is transported by the Canada Atlantic Railway "in bond" through the portion of Canada which intervenes between the Georgian Bay and the United States border.§

The Canadian Government is now engaged in a preliminary survey of the French River with the object of determining whether it can be made available as a waterway. In this route there are probably no greater engineering difficulties in converting the French River and its connecting links into a twenty-foot channel than were incurred by the engineers of half a century ago in constructing the St. Lawrence canals, and if there were, the advance in engineering science would overcome the obstacles. The opening of this northern route to commerce with a twenty-foot waterway would effect a saving of about 400 miles in distance.

The movements of grain on the Great Lakes may be gathered from the following table. It is to be observed that, for the reason just mentioned, the table does not represent wholly Canadian grain.

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* This year (1904) navigation was not closed at Port Arthur until the 10th December, a gain of five days over the usual date. The result was that an unusually small quantity of wheat remained in the elevators at the close of the season, only 1,000,000 bushels. "The United States "engineer in charge of the Sault Ste. Marie Canal, Michigan, reports that the American "Canal was opened on May 5, 1904, 25 days later than 1903, and that the Canadian Canal "was opened on April 30, 1904, or 28 days later than in 1903. The United States Canal was "closed on December 13, 1904, allowing an open season of 223 days. The Canadian Canal "remained open 12 days longer, or to December 25, and, as it opened 5 days earlier, the "season at this lock lasted 240 days." (Department of Commerce and Labour, Bureau of Statistics, Internal Commerce of the United States for the month of December, 1902, 1903, 1904, Washington, 1905, p. 913).

† The effect of this upon the marketing of wheat is discussed below, p. 102.

‡ Capacity of vessels carrying grain from Fort William and Port Arthur, 1904:—

Canadian	38	vessels with capacity of	3,260,000 bushels.
United States	16	" "	2,815,000 "
Totals	54		6,075,000

The traffic through the Canadian Canal at Sault Sainte Marie was in 1901, 28,402,432 tons, and in 1902, 35,962,063 tons. Report of the Department of Railways and Canals, Ottawa, 1901, p. 15.

§ The following table shows the extent of this trade:—

"In transit shipments by lake (in American bottoms only) from District of Chicago to Canadian Ports (Georgian Bay), thence by rail across Foreign Territory to New England points.

	1902.	1903.
Wheat, bushels	2,581,656	2,401,708
Corn "	5,072,924	10,038,764
Oats "	2,878,566	4,090,008 "

(*See* Reports, Chicago Board of Trade, Chicago, 1903 and 1904, pp. 128 and 126.)

The withdrawal of the bonding privilege, if it took place on both sides, would probably affect the trade of the United States at least as much as it would affect Canada. The quantities bonded through either country vary with the incidence of railway rates.

STATEMENT showing the SHIPMENTS of WHEAT and DESTINATION for the SEASONS of NAVIGATION hereinafter enumerated from the PORTS of FORT WILLIAM and PORT ARTHUR.*

Destination.	Season Navigation 1904.		Season Navigation 1903.		Season Navigation 1902.	
	Canadian Vessels.	Foreign (U.S.) Vessels.	Canadian Vessels.	Foreign (U.S.) Vessels.	Canadian Vessels.	Foreign (U.S.) Vessels.
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.
Owen Sound	1,824,963	—	2,009,060	—	1,308,160	—
Midland	2,808,051	—	5,987,248	—	8,316,972	—
Depôt Harbour	6,919,528	—	4,193,463	—	3,515,760	—
Collingwood	688,813	—	629,867	—	—	—
Sarnia	1,788,586	—	1,324,981	—	1,020,197	889,945
Meaford	1,615,334	—	2,697,929	—	1,009,332	—
Goderich	3,494,805	—	3,188,483	—	2,759,884	—
Port Colborne	141,800	—	—	—	—	—
Kingston	624,537	—	1,627,699	—	—	—
Montreal	4,544,774	—	4,188,067	—	1,985,176	—
Sault Ste. Marie	210,000	—	—	—	—	—
Port Huron, Michigan	395,875	—	—	280,279	—	—
Buffalo	1,916,735	2,667,302	2,031,649	6,251,770	636,558	11,256,928
Erie	—	—	—	292,524	—	—
Chicago	—	75,000	—	—	—	—
Detroit	—	80,000	—	—	—	—
Ogdensburg	—	48,000	—	—	—	—

During 1901 and 1902 it became evident that the rapid development of the lake traffic had outgrown the facilities for shipping the grain from Fort William to the Georgian Bay ports during the season of open navigation. This condition stimulated private enterprise, and an additional number of large vessels made their appearance on the lakes in the season of 1903.

This addition to the lake fleets brought out however the deficiency of railway facilities from the lake ports to the seaboard.†

No doubt the railways will meet the increased demand upon them, and there is besides the possibility of deepening the canal system, especially across the isthmus of Niagara and where canals run parallel to the various rapids in the St. Lawrence.

(v.) THE PROPOSED HUDSON'S BAY ROUTE.

The great inland sea, which penetrates to the heart of the Canadian North West, offers at first sight an attractive route for communication with the interior.‡ The distance from Winnipeg by a possible line of railway to Fort York or Fort Churchill, on Hudson's Bay, is only some 700 miles, of which indeed a large part is already constructed.§ The route from Winnipeg, *viâ* Hudson's Bay, to Liverpool, is actually shorter by nearly 700 miles than the route *viâ* Montreal and the Straits of Belle Isle. If this route could be adopted the advantage of saving some 700 miles of land carriage is very obvious. The great drawback is the navigation of Hudson's Straits. These straits, which form the entrance to the bay, lie between the north shores of Ungava and Labrador and the south shores of Meta Incognita. As reported by the Expedition of 1886 (under the late Lieutenant Gordon, R.N.),

* Information received from the Department of Trade and Commerce, Ottawa, 4th January 1905. The navigation opened 7th May 1904 and closed 11th December 1904. 29,913,389 bushels of wheat were shipped during navigation. The following were the stocks of wheat in store at Port Arthur and Fort William at the close of navigation:—1902, 1,251,323 bushels; 1903, 590,409; 1904, 1,598,999. (Information received from Mr. F. E. Gibbs, Inspector of Grain, Fort William, 14th April 1905.)

† Mr. G. R. Crowe, President Winnipeg Board of Trade, 25th Annual Report, 1904, p. xxv.

‡ An account of the navigation of Hudson's Bay and of Hudson's Straits is to be found in "Our Northern Waters, a Report presented to the Winnipeg Board of Trade," by Charles N. Bell, Winnipeg [1884]; more recently there are the Reports (to the Dominion Government) by the late Lieut. A. R. Gordon, R.N., of the Hudson's Bay Expedition of 1884, 1885, and 1886. [Ottawa, 1887]; the Report by Commander Wakeham, of the Canadian Fishery Protection Service, of the Hudson's Bay Expedition of 1897, and, still more recently, the Report (not yet issued) of Mr. A. P. Low, of the Geological Survey, on the same subject (1904).

§ The Winnipeg and Hudson's Bay Railway, subsidised by the Manitoba Government. This line forms part of the system of the Canadian Northern Railway.

navigation of the straits is practicable only from the first week in July until the first week in October. During this period ships of 2,000 tons might navigate the straits provided "sleepless vigilance" was exercised "to keep the ship from disaster,"* on account of the great liability to compass errors owing to the close proximity of the region of the magnetic north. "Snow storms are frequent, though not of great duration."* "Tidal currents add considerably to the dangers of navigation."* This account is corroborated by the reports of other officers who have visited Hudson's Straits.

A vessel caught in the ice after the middle of October runs much risk of being frozen in for the winter, owing to the pack being cemented together by new ice formed by the increasing cold.

Even if the Straits were easily navigable during the months of July, August, and September, it is clear that it would be practically impossible to ship any wheat excepting the crop of the previous season, since the navigation would be closed before any wheat of the current harvest could be transported to the Hudson's Bay port. In some seasons a considerable quantity of wheat is, under present conditions, carried over the winter†; but increased railway facilities may render this condition less common, and in any case the extent to which wheat is so held depends largely upon the state of the market and the estimated likelihood of an advance in price. There can be no doubt that the navigation of the Straits is a physical possibility during at least two months and a half; but it is dangerous and difficult, and the rates of marine insurance would unquestionably be relatively high. For these reasons the commercial advantage of the route is exceedingly doubtful.

(vi.) The Marketing and Transportation of Wheat.

(a.) *Purchase of Wheat from the Farmer.*

The problem of wheat transportation may be said to begin when the crop has been reaped and when the grain has been threshed. In the most favourable cases, where the farm is in the immediate neighbourhood of the railway and the elevator, where the farms are large (480 to 1,280 acres),‡ where the farmers have ample capital enabling them to have an adequate number of horses and a sufficiency of farm labour, and where the roads are good, there is no difficulty in sending the wheat at once to the elevator or to the railway car, without any curtailment of other farming operations. On the other hand, in the most unfavourable cases, where a farm is at a distance from the railway, where the farms are small (160 to 320 acres),§ where the farmer has little or no capital, and only one or two teams of horses, where he works his farm exclusively by his own labour and by that of his family, and where the roads are bad, it is impossible for him to draw his grain to the railway without suspending all other work on the farm.

A farmer in the most unfavourable case must choose between preparing his land by ploughing for the next crop and marketing his wheat. The interval between harvest time and the coming of winter is too short for him to do both together.

He must therefore wait until the frost prevents further ploughing and sets free himself and his animals.‖ He can then, even over the worst roads, to which the frost has now given a good surface, draw his wheat on sleighs to the elevator or to the railway car.

The most favourable conditions exist in Southern Manitoba as a rule and in the districts of Brandon, Portage la Prairie, and Minnedosa, for example, and also in Indian Head (North-West Territories) on the main line of the Canadian Pacific Railway. The least favourable conditions exist in those other portions of the wheat area in which the farms, especially those of new settlers, are still from 25 to 50 miles from a railway, and where the prairie trails are heavy and sometimes almost impassable during a great part of the summer.

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* Gordon, Lieut., Report cited, p. 101.

† 1,598,999 bushels in 1904, *see* p. 101.

‡ From three-quarters of a section to two sections.

§ One-quarter to one-half of a section.

‖ The farmers in England, in Bucks, *e.g.*, suffered in the same way in 1850. They had in some cases to stack their crops in the corner of the field, and wait for frosty weather to carry them home. Caird, James, English Agriculture in 1850–51, London, 1852, p. 11.

In such cases the farmer must hold his grain at his own cost for at least a portion of the winter.

Assuming, however, that the farmer is in a position to deliver his grain to the elevator or to the railway car, what happens? In order to make the present situation clear, it seems necessary to make the following historical statement.

When the country was being opened up in the early days (1884–1890) a number of so-called "flat warehouses" were built by isolated private enterprise at different points on the Canadian Pacific Railway. The proprietors of these flat warehouses purchased the grain delivered to them by the farmers at prices agreed upon between the parties. The flat warehouse proprietors then sold the grain on the Winnipeg Exchange or otherwise, shipping it by the railway as they made up a sufficient quantity to make a car load. The business was small, and it is alleged to have been conducted in a manner which was not very efficient.

Meanwhile in Minnesota and in Dakota the handling of grain at railway stations had been systematised, and great economies had been introduced through the adoption of the elevator system by means of which the grain was manipulated by machinery and the different grades sorted out.

Feeling that the Canadian farmers were being handicapped by the absence of a system which was yielding good results to their competitors, the Canadian Pacific Railway encouraged the formation of elevator companies and the building of elevators at their stations in the wheat-producing areas. In order to induce capitalists to invest in the elevator business, the railway company refused to allow the erection of any flat warehouses at their stations. The elevator companies, although they competed to a certain extent among themselves, were thus given in effect a monopoly in grain dealing at various points.

There could be no doubt about the economy effected by the elevator system; but, as it developed, the farmers complained that the elevator companies took advantage of their monopoly to pay too low a price to the farmers for the grain, and they also accused them of taking advantage both in respect of grades (qualities) and of weights. The farmers also complained that, owing to the Canadian Pacific Railway giving preference to the elevators in supplying cars for the removal of the grain, the farmers were placed at the mercy of the elevator companies. This state of matters was alleged to be aggravated by a shortage of railway cars and of locomotive power.

Neither the railway companies nor the elevator companies admitted the truth of these charges, but the feeling against them, especially among the farmers of Manitoba, became very widespread, and the result was the passing of the Manitoba Grain Act.*

This Act, among other provisions, places the elevator at a railway station on a level with a single farmer as regards the supply of cars, so that any farmer who wishes to ship his grain on his own account can apply for a car to be placed at his disposal. Should he be unable to fill this car with grain on the date specified, or within 24 hours thereafter, the railway company can cancel the order.

It is alleged that since this application and cancellation can be accomplished without any fee, that a farmer can apply, if he chooses to do so, for a succession of cars without really intending to use more than a fraction of them, and that the effect of the provision is to aggravate the shortage of cars which may occur any season in a country growing so rapidly as is the North West. The elevator companies are, moreover, alleged to be prevented from shipping the grain which they have bought so speedily as they would otherwise be able to do. It is clear that only the examination of witnesses of different types, on oath, could bring out the truth of these various allegations; but a sufficient amount of public feeling apparently exists to prevent any such concessions to the elevator companies as might conduce to the promotion of even an apparent monopoly.

It must be observed, however, that the great increase in the number of elevator companies, promoted by Canadian, by British, and by United States capital, suggests that the profits of the trade are still regarded as sufficient to induce capital to go into it, and that probably the competition of the

* 63 & 64 Vict. c. 39. s. 58.

elevators with each other might be held to be now adequate at least to diminish the risk of monopoly.

There can be little doubt that under existing conditions, the large farmer who ships his grain promptly and in large quantities, has great advantages under the present system, while the small farmer probably incurs some contingent disadvantages. He must, as a rule, sell to the elevator, since he has not enough grain to ship on his own account. If the elevator business is restricted to purchasing from the small farmer, it might be held that the economy of its management of the business as a whole was less on that account;* and that this condition conduced to a relatively high charge to the farmer who took advantage of the elevator service.

There is no doubt also that in the event of a "bumper" crop, it might be necessary to suspend all artificial restriction upon the movement of wheat, the speediest method being obviously the most profitable to everyone concerned.

The gist of the matter seems to be that the elevator system is, on the whole, the most convenient and rapid method of handling grain yet devised, and that impediments to the operation of the system must have the effect of increasing the cost of it, directly or indirectly, to the farmer.

The farmer of the North West does not, as a rule, invest his capital in providing storage for his crop. He considers that it is the duty of the railway company to convey his grain immediately after it is threshed.

As indicated above, the period between the harvesting of the wheat and the close of navigation is so short that it is, perhaps, hardly reasonable that the railway companies should be expected to concentrate their rolling stock on some particular section of their line in such a way as to make certain that all the wheat is drawn out before the navigation closes.

When to this consideration is added the legislative restrictions upon the supply of rolling stock to farmers and elevators, it is apparent that either the railways must add to their rolling stock to a probably unprofitable extent, considering the brief period of maximum use, or the farmers must relax the extent to which they take advantage of the Grain Act.

(b.) *The Elevator System.*

The most conspicuous object in the prairie town is the elevator,† or granary. The elevators stand in a row along the railway line near the

* The following gives a sketch of the controversy from the point of view of the grain merchants :—

"Every person concerned is aware that in this western country the marketing of grain comes with a rush in the fall of the year, when every car and every locomotive must be pressed into the service in order to move the grain to the lake front as quickly as it is being delivered at country points. In addition to this, it is absolutely necessary that there shall be provision made at railway stations for the care of grain as it is hauled from the farms to the stations. The provisions of the Act that were made in order to facilitate what is known as track loading, were put through as a safety valve and as a protection for the farmer, so that the buyers of grain at the elevators could not unfairly reduce the price below what was a fair market value; but it is manifest to every person who knows anything of the subject at all, that the grain in this country cannot be moved forward by any railway company, even if such company possessed the most complete equipment, by the process of track loading. Sir William van Horne foresaw this in the early days of the Canadian Pacific Railway Company, and took steps to secure the erection of proper elevators along the lines of that railroad; and ever since that time elevator building has kept pace with the requirements of the country. It requires no argument of mine to show that a law that takes away from the owner or operator of an elevator the right to ship the grain that he may see fit to purchase at such stations, must react upon the farmer. . . . As the law stands at present it has worked and will work injury to every interest."—Mr. G. R. Crowe, President Winnipeg Board of Trade's 25th Annual Report, 1904, p. xxxiii.

"The yearly recurring question of transportation, whilst not brought before you this past season as part of the business of the Exchange, has nevertheless been a matter of complaint from several parts of the Province and Territories. I am of the opinion there would have been little congestion, if any, if the disposition of the rolling stock of the railway companies had not been regulated by a Dominion Act. The principle of legally preventing a shipper having a very large quantity of grain to ship, from obtaining the necessary rolling stock until such time as all the small quantity owners have had their requirements supplied in full, is manifestly most unfair to the trade, and is a restriction on the business of the members of the Grain Exchange, which should not exist, and also which undoubtedly was the cause of making congestion worse congested."—Mr. F. Phillipps, President Winnipeg Grain and Produce Exchange, Sixteenth Annual Report, 1904, Winnipeg, 1904, p. 16.

† Or silo, as it is called in England.

station in numbers proportioned to the importance of the district. Throughout the North West there are nearly one thousand elevators situated at about three hundred stations, providing altogether a storage capacity (exclusive of terminal elevators at Port Arthur) of nearly twenty eight million bushels.*

An elevator company usually owns from thirty to forty elevators situated at different stations. The advantage which the farmer has in dealing with the elevator at the railway station nearest to his farm is that he not only knows what his wheat will fetch at the moment of delivery, but he gets his money on the spot. He has no need to wait for returns from a distant grain merchant. The disadvantage that he suffers is that he pays, or appears to himself to pay, too high a price for the facilities afforded by the elevator.

Wheat of the new crop begins to come in to the elevator about the 1st September. In order that advantage may be taken of the relatively cheap summer route by the great lakes, wheat intended for export or for consumption or manufacture into flour in Eastern Canada is hurried as fast as possible to Port Arthur on Lake Superior. The season is short†; indeed, even before the restrictions placed upon the business of the elevators by the Grain Act,‡ the elevators ceased to buy for summer shipment on the 20th November. After that date they knew that they could not get the wheat out excepting for relatively expensive winter rates for all rail transportation. Now they stop buying at summer rates on the 20th October. As the 20th November approached, they used to charge a margin of 3 cents per bushel to cover the risk of possible non-shipment. Now they charge a margin of 8 cents as the 20th October draws near,§ and they increase this to 10 cents per bushel when they estimate that they have bought as much wheat as they can get out before the close of navigation on the great lakes.

The difference between the water freight and the all-rail freight varies according to the periods taken for comparison and according to the route—all water or water and rail. It is approximately fair to say that there is a difference of from ½ cent to 1 cent per bushel in favour of holding the wheat over the winter in an elevator in the West and shipping it in the summer.

The cost of carrying wheat over the winter in an elevator is 3¾ cents. This includes 2½ cents for storage and 1¼ cents for insurance. There is besides a charge of ¾ of a cent for receiving and delivering. The addition of interest to these charges brings up the total cost of holding wheat over the winter to about 7½ cents per bushel. The all-rail freight in winter between Fort William and Halifax, or St. John or Portland (Maine), is 25 cents per 100 lbs., 24 cents to West St. John and Portland, the summer rate *viâ* the Great Lakes to Montreal is 6 cents per bushel.

The extent to which the railway companies (the Canadian Pacific and the Canadian Northern) have succeeded in transporting from the country elevators to Port Arthur the wheat offered for shipment between 1st September and 5th December has varied very much in different years. When the crop has been large (as in 1901 and 1902), there has been a "grain blockade," and at the same time all other traffic has been impeded.

In years of deficient crop, on the other hand, there has been no difficulty in transporting all the wheat offered.

The elevator system as at present organized is a great advantage to the large farmer. He gets his threshing done early because he can afford to pay high wages for assistance. His wheat blocks the elevator in the early days of the purchasing period. The elevator manager, uncertain whether or not he can get the wheat he has bought out by rail in time for shipment, refuses to buy on the ground that his elevator is full, and thus the small farmer is likely to suffer.

It is obvious that under the existing conditions alike as regards grain legislation and as regards farming practice, a few days' extension of the shipping

* About 3½ times the capacity of all the grain warehouses at Liverpool.

† *See* p. 99. ‡ *See* p. 103.

§ From the point of view of the elevator companies the farmer thus suffers a loss of 5 cents per bushel on all wheat which he sells to the elevator between 20th October and 20th November.

period, or still more the possibility of taking the wheat out of the country by rail during the winter months at a rate which would obviate the economic necessity of keeping the wheat in the North West during the winter, would be of vast advantage to the country. The growth of the population in the west, and the consequent growth of the total traffic resulting in the diminution of the train mile cost, can alone bring permanent amelioration of the conditions. The idea that it can be done by legislative fixation of railway rates or even by Government ownership and operation is probably illusory, unless indeed it is intended that the burden should be shifted to the shoulders of the community.

The practice of selling wheat for future delivery, which undoubtedly promotes speculation, is defended by the elevator companies on the ground that millers require deliveries of wheat at certain dates. Thus future deliveries must be arranged for in advance. This leads to future wheat being sometimes at a premium and sometimes not. The elevator companies require to provide a margin for contingencies, because sometimes in the end of December and the beginning of January they may find that the market is going against them, yet deliveries must be made. For deliveries in the remoter future further risks must be run; and thus the margin between the market price and the price the elevator pays to the farmer at the close of the shipping season—the season for immediate delivery—must be greater in order to secure against the risks of the whole operation.

The dislocating influences of changes in the relative quantities exported and retained for domestic consumption or domestic manufacture into flour, must also be taken into account.

(c.) *Grain Inspection.*

The wheat, being brought by the farmer to the elevator, the manager determines its grade, and the determination of the price follows automatically.*

As the case stood for some years, wheat when received from the farmers at the local elevators was mixed; and no doubt sometimes clean and dirty wheats were mixed together. The wheat was then inspected at Winnipeg and standardized. When this was done, no further mixing was allowed, as no inspection took place at the port of shipment in Canada—viz., chiefly Montreal. The "battle of the standards" was waged partly about the grades or qualities which were alleged to be too numerous, and partly about the place of final inspection; some wished to provide for inspection at Montreal† with the corollary that wheat might be mixed there, others wished an appeal to lie from the inspector and the standard board to the survey boards. It was alleged on behalf of the western interests that, when wheat was mixed at Montreal, Ontario spring wheat was mixed with Manitoba spring wheat, and that the advantage of the superior quality of the Manitoba wheat was lost. On the other hand, it was pointed out that no Ontario spring wheat is now grown for export, and that if it were, the Manitoba wheat is so much harder that any mixing would be readily detected.

The question is full of technical difficulties, owing to the number of standards, the frequent changing of them, and also it must be said the rivalry of eastern and western grain merchants. As one speaker put it "what is "wanted is to get a fair valuation for the men who grow the grain as well "as for the man who purchased it."‡ This is no doubt what is wanted; but a perfectly fair arrangement is difficult to arrive at amid the obvious conflict of interests.

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* "All offers made for the purchase of grain on track at country points for immediate shipment, or on a date of shipment which gives the seller the option of immediate shipment, must be based on the current market value of grain in store at Fort William elevators for immediate delivery on the same day such offers are made." Amendment to Bylaw 19, Winnipeg Grain and Produce Exchange, Sixteenth Annual Report, Winnipeg, 1904, p. 23.

† The controversy upon grain inspection is partly to be found in a Report by a Committee of the Winnipeg Board of Trade, Twenty-fifth Report 1904, p. 39, *et seq.*

‡ At a meeting of the Special Committee appointed to consider the Grain Inspection Act, Ottawa, June 9th, 1904.

In May 1904 a bill was introduced to provide for the eastern and western inspection of grain; for the establishment of examining boards for the examination and appointment of properly qualified persons to act as wheat inspectors, of standard boards to fix the standards for commercial grades, *i.e.*, for grain damaged by climatic or other influences, and of survey boards to which appeals might be made; and to provide inspectors with standardized samples. The bill also amended the Grain Inspection Act, in the direction of simplifying the grades. These were reduced from eight to four in the case of wheat, and similar reductions were made in other grains. This bill was passed in June 1904.*

The following statistics are illustrative of the account of the wheat situation given in this and in the preceding section:—

TABLE showing the Quantity of WHEAT Inspected at WINNIPEG for Crops of the Years 1901–2, 1902–3, and 1903–4.†

Crop of 1901–2.	Wheat in Bushels.
Inspected during the three months ended 30th November 1901	22,153,000
Inspected during the three months ended 28th February 1902	12,075,000
Inspected during the three months ended 31st May 1902	12,588,000
Inspected during the three months ended 31st August 1902	6,892,000
Total for crop of 1901–2	53,708,000

Crop of 1902–3.	Wheat in Bushels.
Three months ended 30th November 1902	22,367,000
Three months ended 28th February 1903	11,985,000
Three months ended 31st May 1903	11,106,000
Three months ended 31st August 1903	6,375,000
Total for crop of 1902–3	51,833,000

Crop of 1903–4.	
Three months ended 30th November 1903	18,494,000
Three months ended 28th February 1904	6,966,000
Three months ended 31st May 1904	7,155,000
Three months ended 31st August 1904	5,858,000
Total for twelve months	38,473,000

* 4 Edw. VII. c. 15.

† Information received from Mr. Charles C. Castle, Warehouse Commissioner, Winnipeg, 17th May 1904. The statistics are customarily given in car loads. A car load is regarded as equivalent to 1,000 bushels for statistical purposes.

TABLE showing the WHEAT situation in MANITOBA and NORTH-WEST TERRITORIES, 1st March 1904.*

	Bushels.
Total yield of the crop of 1903 -	53,984,878
Inspected up to 1st March 1904 - - -	25,460,000
In store at country points on 1st March 1904 -	9,078,259
In transit (not yet inspected) - - -	800,000
Allowance for seed - - - - -	7,500,000
Allowance for country mills - - -	6,500,000
Balance in farmers' hands - - - -	4,646,619
	53,984,878

TABLE showing the GRAIN ELEVATOR and WAREHOUSE CAPACITY in the SIXTEEN STATISTICAL DISTRICTS of the NORTH-WEST TERRITORIES in the YEARS 1901, 1902, and 1903.

Districts.	Capacity in Bushels.		
	1901.	1902.	1903.
No. 1 - - - - - -	675,000	908,000	1,514,000
„ 2 - - - - - -	107,000	241,000	305,000
„ 3 - - - - - -	536,000	575,000	1,361,000
„ 4 - - - - - -	618,000	828,000	1,330,000
„ 5 - - - - - -	754,000	1,168,000	1,439,000
„ 6 - - - - - -	—	—	—
„ 7 - - - - - -	68,000	228,000	530,000
„ 8 - - - - - -	—	—	—
„ 9 - - - - - -	220,000	415,000	726,000
„ 10 - - - - - -	—	—	—
„ 11 - - - - - -	—	—	—
„ 12 - - - - - -	347,000	347,000	306,000
„ 13 - - - - - -	58,000	58,000	65,000
„ 14 - - - - - -	—	—	—
„ 15 - - - - - -	72,000	72,000	72,000
„ 16 - - - - - -	—	3,000	3,000
Total for N.W. Territories - -	3,455,000	4,843,000	7,651,000

TABLE showing TOTAL RECEIPTS and SHIPMENTS from 1st September 1903 to 29th February 1904.*

	Bushels.
Total receipts at country elevators and warehouses -	31,040,856
Total shipments from country elevators and warehouses -	21,962,597
Balance in hand - - -	9,078,259

Of this "balance in hand" 1,159,388 bushels are farmers' wheat.

Inspected to date - - - - -	25,460,000
Less shipments from country elevators and warehouses -	21,962,597
Loaded direct on cars from farmers' waggons - - -	3,497,403

* Information received from Mr. Charles C. Castle, Warehouse Commissioner, Winnipeg, 17th May 1904.

† Department of Agriculture, North-West Territories, Annual Reports, Regina n.d.

TABLE showing the different GRADES of WHEAT Inspected at WINNIPEG from 1st September 1903 to 29th February 1904.*

Grade.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Total—Cars.	Total—Bushels.	Per Cent.
1 Hard	255	94	104	17	6	6	482	476,000	2
1 Northern	1,509	1,787	1,165	226	96	99	4,882	4,783,000	17
2 Northern	770	3,244	2,019	819	294	153	7,299	7,146,000	29
3 Northern	152	1,812	2,429	1,812	605	215	7,025	6,810,000	26
No. 4 Wheat	1	297	627	523	301	187	1,936	1,749,000	9
Feed	—	129	277	417	305	101	1,229	1,128,000	5
Feed 2	—	34	117	107	197	57	512	455,000	2
Screenings	—	—	2	3	4	2	11	9,000	—
Rej. 1	57	121	105	74	31	11	399	388,000	2
Rej. 2	23	79	73	53	45	10	283	273,000	1
No. G.	309	666	181	95	51	21	1,323	1,302,000	7
Rej.	12	25	12	12	4	3	68	65,000	—
Cond.	1	1	5	4	—	—	11	11,000	—
	3,089	8,289	7,116	4,162	1,939	865	25,460	24,595,000	100

TABLE showing the STORAGE CAPACITY of LICENSED ELEVATORS and other GRAIN WAREHOUSES in MANITOBA and the NORTH-WEST TERRITORIES; and of the ELEVATORS of the CANADIAN PACIFIC RAILWAY COMPANY, and the CANADIAN NORTHERN RAILWAY COMPANY, at PORT ARTHUR, ONTARIO.

	Storage Capacity in Bushels. 1902–3.	1903–4.
Country elevators and warehouses	21,250,000	27,214,000
Terminal elevators at Port Arthur	9,130,000	13,972,000
	30,380,000	41,186,000

Additional terminal elevators of the following capacity are now being constructed.

	Bushels.
Canadian Pacific Railway	500,000
„ Northern Railway	3,500,000
Ogilvie Flour Mills Company	500,000
Empire Elevator Company	1,500,000
	6,000,000

When these additions are effected the total terminal capacity will amount to upwards of forty-six million bushels.

In addition, the Grand Trunk Pacific Railway promise to construct a large terminal elevator system, and no doubt country elevators will gradually spring up along the line proposed to be constructed.

* From information received from Mr. Charles C. Castle, Warehouse Commissioner, Winnipeg, 17th May 1904. The first four grades are fixed by Statute. The standards for the other grades are fixed annually (if necessary by the Western Grain Standards Board).

(vii.) Estimates of Visible Supply of Wheat.

The customary calculations of the "visible supply" of wheat which are made on behalf of the Chicago Board of Trade, and upon which much speculation takes place, do not now include Canadian wheat. The reasons for this, as given by Mr. Geo. F. Stone, the Secretary of the Chicago Board of Trade, are that the wheat in stock in Canadian elevators at Fort William and Port Arthur are no more available for the United States markets than wheat from Argentina.* This is true; but the inclusion in the statements of "visible supply" of Canadian wheat "in bond" at Buffalo confuses the statement to the extent of the influence of the quantity of that wheat. If a Canadian authoritative "visible supply" estimate were published, it need not include the quantity in store at Buffalo; but if it did not, it would scarcely give a fair representation of the quantity of Canadian wheat in the "visible supply." Unless corrections upon the customary statistics are made in view of these circumstances, a rather inaccurate notion of the "visible supply" is apt to be propagated. As Canadian wheat increases in quantity of course this inaccuracy will be aggravated, although it will vary with the quantity of wheat held in store in the United States.†

(viii.) Wheat Exports.

The following table‡ shows the quantity of wheat inspected for export at Winnipeg during the years from 1895 to 1903 :—

Crop.	Bushels.
1895	29,000,000
1896	14,000,000
1897	22,000,000
1898	23,000,000
1899	30,000,000
1900	17,000,000
1901	50,000,000
1902	53,937,000
1903	38,073,000

The quantity of wheat "Inspected for export at Winnipeg" includes the supplies for the mills in Eastern Canada. Since some portion of the crop of one year usually remains in the elevators after the close of the "crop year" on 31st August, the statistics cannot, as thus given, be brought to harmonise with the statistics of the export of wheat from all Canada as given in the Trade Returns prepared by the Department of Trade and Commerce. The table on the next page shows the quantity of wheat and flour, the produce of all Canada, exported to various countries during the statistical years ending 30th June. It will be observed that the quantities vary very greatly. The exports to Great Britain form in all years the bulk of the exports; but they vary from 33 million bushels in 1903 to 16 million bushels in 1904. It should also be said that the exports of wheat to Europe out of this season's crop are understood to consist almost wholly of the inferior qualities. The best qualities have been secured by the Canadian millers or have been exported to the United States, as yet however, to a small extent.

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* In a letter to the Secretary of the Winnipeg Grain Exchange, 29th April 1903. Report of Winnipeg Grain Exchange, 1904, p. 22.

† Buffalo is the only centre in the United States where Canadian wheat is held in store in quantity. The expression "in bond" as applied to Canadian wheat in the United States includes wheat "in transit" as well as wheat in store.

‡ Information supplied by Mr. C. C. Castle, Warehouse Commissioner, Winnipeg, 1st December 1904.

TABLE showing the QUANTITY and VALUE of WHEAT and of WHEAT FLOUR, the PRODUCE of CANADA, EXPORTED from CANADA during the YEARS ended JUNE 30, 1902, 1903, and 1904.*

Countries.	1902.		1903.		1904.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
WHEAT.	Bushels.	$	Bushels.	$	Bushels.	$
Great Britain	25,244,489	18,021,257	30,726,947	22,999,745	16,346,793	13,106,081
British West Indies	6	6	23	18	10	13
Newfoundland	4	4	6	4	20	20
Belgium	586,861	448,397	706,733	555,198	267,646	224,410
France	195,280	153,586	—	—	—	—
Germany	8,000	6,800	287,063	187,147	—	—
Holland	6,603	4,425	101,433	77,317	21,137	16,910
Italy	61,199	41,456	99,010	66,298	—	—
United States	15,088	9,161	892,904	536,264	11,262	8,780
Australia	—	—	98,785	69,615	8,001	8,000
British Africa	—	—	115,615	70,807	110,306	88,985
New Zealand	—	—	5,000	3,000	—	—
British Possessions, other	—	—	2,226	1,290	13,104	11,550
Japan	—	—	—	—	749	602
Total	26,117,530	18,688,092	32,985,745	24,566,703	16,779,028	13,465,351
WHEAT FLOUR.	Barrels.	$	Barrels.	$	Barrels.	$
Great Britain	648,199	2,290,056	633,250	2,338,667	940,040	3,568,430
Australia	69,118	231,636	167,112	571,336	13,148	45,893
British Africa	85,915	357,636	143,949	520,436	155,261	632,348
British East Indies	—	—	570	960	—	—
British Guiana	7,918	25,008	23,999	80,748	26,058	102,151
British West Indies	36,775	123,315	43,624	152,568	49,007	204,201
British Possessions, other	—	—	378	1,250	3,942	11,580
Fiji Islands	39	95	7,439	26,181	7,961	28,253
Gibraltar	—	—	564	1,650	1,139	4,012
Hong Kong	—	—	363	1,480	570	1,858
Newfoundland	218,458	852,315	223,210	843,956	228,984	930,921
New Zealand	—	—	4,651	16,261	—	—
China	—	—	708	2,331	2,508	9,058
Cuba	—	—	50	168	415	1,955
Denmark	1,015	3,288	5,143	20,005	9,445	36,152
Dutch Guiana	—	—	25	100	50	200
French Guiana	—	—	50	163	—	—
French West Indies	4,132	14,707	2,167	7,647	14,672	59,123
Germany	—	—	480	2,085	950	3,885
Holland	182	599	275	1,000	3,221	11,563
Japan	—	—	611	2,167	43,296	140,815
Norway and Sweden	—	—	3,203	10,634	18,092	61,509
Portuguese Africa	—	—	196	850	500	1,400
Russia	—	—	5,488	22,019	24,589	95,453
St. Pierre	2,459	9,473	1,562	6,440	1,783	8,264
Colombia	—	—	60	225	—	—
United States	10,485	37,455	18,940	68,216	40,958	164,862
Brazil	550	1,887	—	—	—	—
Egypt	204	825	—	—	—	—
France	1,201	3,855	—	—	—	—
Belgium	—	—	—	—	336	1,680
Chile	—	—	—	—	200	300
Ecuador	—	—	—	—	405	1,830
Portugal	—	—	—	—	70	330
Total	1,086,648	3,951,850	1,287,766	4,699,143	1,587,600	6,129,226

The table on the next page shows the quantity of wheat and flour, whether the produce of Canada or of foreign origin, exported to various destinations in the five months from July to November, 1904.

* Information supplied by the Customs Department, Ottawa, November 29, 1904.

TABLE showing the QUANTITY and VALUE of WHEAT and WHEAT FLOUR EXPORTED from CANADA during the five months ending November 1904.*

Country.	Produce of Canada.		Not the Produce of Canada.	
	Quantity.	Value.	Quantity.	Value.
WHEAT.	Bushels.	$	Bushels.	$
Great Britain	5,448,483	4,484,665	58,049	47,179
United States	242,414	217,885	—	—
Belgium	172,085	141,661	—	—
British Africa	4,513	3,500	—	—
Newfoundland	10	9	—	—
Total	5,867,507	4,847,720	58,049	47,179
WHEAT FLOUR.	Barrels.	$	Barrels.	$
Great Britain	296,995	1,166,203	315	1,322
United States	16,268	75,910	772	7,719
British West Indies	22,072	98,831	—	—
Newfoundland	134,010	605,561	—	—
Australia	5,698	22,235	—	—
Malta	286	1,300	—	—
Bermuda	5,069	22,265	—	—
British Guiana	5,131	22,266	—	—
„ Possessions, other	708	2,435	—	—
„ Africa	56,633	253,556	—	—
Norway and Sweden	12,515	47,235	—	—
Denmark	8,834	36,837	—	—
Russia	7,589	30,117	—	—
Ecuador	200	855	—	—
Holland	1,348	4,960	—	—
St. Pierre	693	3,381	—	—
Portuguese Africa	500	2,375	—	—
Fiji Islands	204	950	—	—
Spain	220	1,040	—	—
French West Indies	506	2,115	—	—
Japan	3,225	12,360	—	—
Germany	250	750	—	—
Total	578,954	2,413,627	1,087	9,041

The most obvious features in the above tables are the falling off in the total exports of wheat from Canada (principally to Great Britain), and the violence of the fluctuations in the exports to the United States. The latter exports vary from nearly 900,000 bushels in 1903 to 11,000 bushels in 1904. There is also to be noticed an increase in the exportation of flour in 1904 of about 50 per cent. or 500,000 barrels over the exportation in 1902. Of this increase Great Britain took about 300,000 barrels, raising the quantity exported to that country to nearly a million barrels.

It has been the practice of the United States Customs Department to allow a drawback upon imported wheat when that wheat was employed for mixing with wheat grown in the United States in the manufacture of flour which was ultimately exported. This provision was intended to enable the mills of Minneapolis, for instance, to improve the quality of their flour by mixing a certain proportion of Manitoba hard spring wheat with the softer wheats of the Western States, and by this means to encourage the export trade in flour. The mode in which the drawback was allowed, however, prevented it from being taken advantage of to a material extent, and the comparatively low price of United States wheat, together with the domestic demand for flour, prevented the millers from bringing any great pressure to bear upon the United States Government to make the process of obtaining the drawback easier.

The conditions in the season of 1904 have however produced a change. The high price of wheat in the United States market ($1.23⅝ per bushel on November 12th, for example) enabled the Minneapolis millers to buy

* Information supplied by the Customs Department, Ottawa, December 16th, 1904.

Manitoba wheat with advantage; and, naturally desiring further benefits, they requested to be allowed to grind Canadian wheat in bond. This was granted, and Canadian wheat was thus imported at a net duty of 1 per cent. into the United States when intended for export as flour, while the full duty still remained upon wheat intended for consumption in that country.

This provision was shortly withdrawn. It did not continue for a sufficient length of time to influence materially the quantity of wheat exported from Canada. From the close of the fiscal year in June 30th, 1904, until November 30th, the quantity of wheat exported to the United States was considerably in excess of the amount exported in the 12 months prior to June 30th, 1904; but it does not yet approach the quantity exported to that country in 1903.

It is not possible at present to predict what the effect of the present shortage of wheat in the United States may lead to in the near future. Probably, among other results, it may lead to the utilisation in the United States, perhaps by means of State aid, of lands at present outside the area of cultivation on account of their marshy character (as in the State of Minnesota), or on account of their aridity, as in the States in the arid region. The probable fall in the value of land which may be produced in some States by emigration to Canada may result in drawing migrants from the Eastern to the Western States, and to a renewed activity in the cultivation of wheat.

VIII.—General Conclusions.

It is obvious that the period over which observations can extend in a recently organised country is very short, and that conditions change with great rapidity.

Conclusions must therefore in all cases be provisional.

The following may be suggested as springing out of the foregoing data:—

1. Regarding the area susceptible of colonisation as being fairly set forth in the estimates quoted above, it seems admissible to infer that this area will in time be colonised in such a way as to offer the probability of its being occupied at least to the same extent, and in the same general way, as the corresponding States of the North Central Division of the United States.

2. The addition to the existing population which such a colonisation would involve may be regarded as coming necessarily—

(*a*) from the Eastern Provinces of Canada,
(*b*) from the United States,
(*c*) from Continental Europe, or
(*d*) from Great Britain.

(a.) *From the Eastern Provinces.*—While the pressure of population in the settled areas of the Province of Quebec may result in migrations of French Canadians to the west, there are at present large tracts of unsettled land remaining in the Province of Quebec which may be regarded as more likely to absorb the agricultural migrant than the western plains. Those who leave that province go, as a rule, into the manufacturing towns of the United States, and do not wish to farm. As regards Ontario, while the sons of Ontario farmers may find it to be to their advantage to go to the west, it would appear as though this migration did not at present form a very considerable part of the total migration.

(b.) *From the United States.*—Of late years there has been a considerable migration, alike of re-patriating Canadians, of native-born Americans, and of foreigners who have lived in the United States for varying periods. The conditions in the United States which have promoted this migration seem likely to cause it to continue.

(c.) *From Continental Europe.*—The Austrian and Russian immigrations have been for some time the most conspicuous features of continental immigration. Again, conditions seem likely to promote this movement indefinitely.

(d.) *From Great Britain.*—The comparative smallness of the proportion of the population of the United Kingdom which is now engaged in agriculture, seems to preclude the possibility of immigration at once effective enough and numerically considerable enough to occupy the country before colonists from other countries have already possessed themselves of at least a great part of it. Recruiting of the western towns from the United Kingdom may occur, but only in the teeth of opposition from the trade unions, whose members look upon every newcomer into a town in search of work as an interloper, and only with a certain disadvantage to the North West, where the demand at present is for farmers, and not for artisans. From these considerations it seems fair to conclude that the bulk of the immigration in the immediately succeeding period is more likely to be from the United States and from Continental Europe than from the United Kingdom.

3. While the suitability of a large proportion of the area in question for agricultural production may be regarded as quite undoubted, the extent to which a particular crop, wheat, for instance, will be grown in the future, must depend upon a series of complex influences, the precise weight of which cannot be predicted, especially for remote periods of time. Given, however, an excess of wheat above what is necessary to meet the local and domestic requirements, the destination of that wheat may be held to depend upon the prices offered for it in the external markets. It would appear that Great Britain and the United States (and perhaps also in the future to an important extent Japan) must enter into purchasing competition for Canadian wheat.

4. Tariffs would in each case require to be taken into account. It is obvious, however, that should the United States admit Canadian wheat for milling purposes duty free (in the interests of the United States and without any *quid pro quo* on the part of Canada), two results would follow :—first, that there would be a stimulus to wheat production in Canada, and second, that the United States would be placed in as favourable a situation for purchasing as any other country with the added advantages of close proximity and cheap carriage.* If the net economic advantage lay in exporting to one country rather than to another, the wheat would *ex hypothesi* be disposed of in accordance with this net economic advantage; that is, under such conditions it would go to the United States rather than to Great Britain, provided the price in the former were as high as in the latter.

5. The extent to which wheat is manufactured into flour in Canada, would, however, tend to qualify the last conclusion. If the Canadian millers paid as high a price for wheat as the millers in the United States, they might then export their flour to some countries to which, through preferential tariffs or otherwise, the United States flour could not be so advantageously exported. Whether or not they could export would depend upon the comparative price in those countries. For example, the price of Canadian wheat in the United States might rise to such an extent that the Canadian miller could not obtain wheat to mill for export as flour: or could not obtain it at a price which would enable him to compete with the British miller, if simultaneously wheat were obtainable by the latter from Argentina, Russia, and India at a price lower than American wheat.

6. Very great improvements in the productive power of the country, and a very considerable increase in the effective population, as well as a more exclusive regard to wheat cultivation, would have to take place before the North West could be regarded as being in a position to be relied upon to produce for export to Great Britain a quantity of wheat even nearly sufficient for the growing requirements of that country.

That an exclusive regard to wheat cultivation is unlikely to arise in the North West seems certain from much of the foregoing detail. Even if the soil were uniformly suitable, and even if the seasons could be absolutely relied upon, the disposition of the people and their settlement upon small farms of which the owner is also the cultivator seems against the exclusive cultivation of

* A relaxation of the "drawback" regulations, which would have had the effect of admitting Canadian wheat intended to be milled for export at a net duty of one per cent., was urged in the end of 1904, but the United States Senate refused to sanction the arrangement.

one crop. The tendency of the knowledge derived from experience and of the instruction and advice derived from the experimental farms, as well as other governmental encouragement of mixed farming, are all opposed to exclusive cultivation of wheat or of any other one crop, as is also the experience of the States immediately to the south of the International Boundary.

7. While the climate of the north-eastern portion of the North West is undoubtedly severe, it is not unhealthy, and settlers quickly learn how to make themselves comfortable. The climate of the southern and western portion is comparatively mild, and the precipitation in the semi-arid region being low, there is comparatively little snow. The winds are sometimes, however, very trying throughout the region. In the summer, the clear sky and bright sunshine, longer in duration in the higher than in the lower latitudes, and the cool dry atmosphere of the prairies render the region singularly attractive.

8. Many of the drawbacks of the country are due to the fact that its settlement is so recent. Such drawbacks are rapidly disappearing under the influence of colonisation and intelligent co-operation and administration.

When a country is in a formative stage, it is peculiarly open to disproportionate and sometimes to premature expansion, with recurring periods of reaction and inflation. The North West has experienced such periods already during its short history, and may be expected to experience similar fluctuations again.

The gradual settlement of an industrious population upon a fertile soil and in a climate by no means inhospitable, must, however, result in a more or less constantly increasing economic stability of which the foundations, it is clear, have already been laid.

APPENDIX A.

Text of Estimate One.

(*See* Report, pp. 71 *et seq.*, and Map at end of Volume.)

Memorandum as to the Grain Growing Resources of Manitoba, Assiniboia Saskatchewan and Alberta.

Outside of Assiniboia it will be noticed that there is a very considerable area not classified, which is uncoloured in the map accompanying this memorandum.* It is not assumed that the whole of that is worthless from a food production standpoint, while there is a very considerable portion such, owing to mountains, rock, water areas and undrainable marshes or muskegs, also many which if drained and cleared up would prove of little or no value; still there is a considerable percentage which can be of much value in supporting a population, but for the main purpose of this memorandum it has not been considered.

It is not contended that the different coloured belts define with anything approaching accuracy the correct sub-divisions of the country into the different classes, but for the purpose desired it is hoped sufficiently so.

The division of the belts into their various percentages is of course merely a matter of judgment, but it is at least believed that the results as worked out are well within the mark and will give the information it was understood was desired.

The area coloured yellow is the best adapted as a grain territory. Contains 36,000,000 acres. Of that, 50 per cent. will average "A 1" soil, moisture and climatic conditions being such that in any cycle of ten years the average over the whole area would be high. Twenty per cent. of the whole will average good. Balance (30 per cent) is precarious or too rough, stony, gravelly, to be economically cultivated, or is occupied with water areas, so that one might safely assume 70 per cent. of whole suitable for grain, balance fairly good for pasturage and growth of belts of timber, &c., including some water areas.

Taking it as a whole, probably 65 or 70 per cent., or, say, 45 per cent. of entire area will prove also as fairly well adapted for mixed farming.

In the best large grain growing areas probably not more than one-third, or, say, 35 per cent., could be depended upon to be in crop in any one year. In the district under discussion, when well settled, it would be reasonable to assume that 30 per cent. of the 70 per cent., or, say, 21 per cent. of whole, could be annually cropped; this would give an area of 7,500,000 acres. Take 6,000,000 as devoted to wheat, and applying the average wheat crop, that of Manitoba 1891 to 1902, 12 years, viz., 18·5 bushels per acre, then the probable annual production would be 111,000,000 bushels. Take two-thirds of that as export, give 74,000,000 bushels for that purpose.

The portion coloured yellow with blue horizontal lines, containing an area of 47,000,000 acres, is particularly well adapted to mixed farming. Of that 35 per cent. is naturally first class. Ten per cent. additional will directly or indirectly by reason of irrigation be rendered "A 1." Fifteen per cent. is fair. Balance 40 per cent. varies from fair to poor. Very little, if any, wholly valueless.

This area in Saskatchewan and Northern Alberta is covered with bush and timber to the extent of probably 20 per cent., or 10 per cent. of the whole area. In the whole there are probably water areas to the extent of 3 per cent. The greater portion of said areas are also in the timbered portion.

Of the 45 per cent. that is classified as good, probably 70 per cent. will prove good for wheat, and of the 15 per cent. classified as fair, 30 per cent. will also. That makes 36 per cent. of the whole, or 17,000,000 acres wheat producing. As this is a mixed farming area, a larger percentage of what is suitable could be maintained annually in grain than in a straight grain producing area. It would be safe to assume that 50 per cent. of it could be utilized for wheat, or, say, 8,500,000 acres, placing 70 per cent. of that in wheat, or, say, 6,000,000 acres at the average annual production in Manitoba, or 18·5 bushels per acre, gives an output annually of 111,000,000 bushels. Allowing two-thirds for export, equals 74,000,000 bushels.

The portion coloured yellow with blue vertical lines is practically a straight pasturage area, containing 28,000,000 acres; about 15 per cent., or 4,000,000 acres, will be valuable for mixed farming. Of the said 4,000,000 probably 1,000,000 could annually be devoted to wheat. Placing the product at 18·5 bushels per acre, equals an annual production of 18,500,000 bushels; two-thirds being available for export gives 12,000,000 bushels for that purpose.

* *See* map at end of volume.

The portion coloured blue contains an area of 42,000,000 acres on which there is more or less timber, scrub, water areas, and very rough broken territory, so probably not more than 50 per cent. will be available for pasturage or cultivation, or an area equal to 21,000,000 acres. In the latter mixed farming could be carried on to the extent of probably 15 per cent. thereof, or, say, 3,000,000 acres, and about 750,000 acres will be available annually for wheat production; placing the production at 18·5 bushels per acre equals 13,875,000 bushels, and taking two-thirds for export, gives 9,250,000 bushels available for that purpose.

RECAPITULATION.

	Bushels.
Yellow.—Annual amount available for export	74,000,000
Yellow with blue horizontal lines.—Annual amount available for export	74,000,000
Yellow with blue vertical lines.—Annual amount available for export	12,000,000
Blue.—Annual amount available for export	9,250,000
Total	169,250,000

That would be divided up as follows:—

Colour.	Manitoba.	Assiniboia.	Saskatchewan.	Alberta.
	Bushels.	Bushels.	Bushels.	Bushels.
Yellow	33,300,000	27,380,000	12,580,000	740,000
Yellow with blue horizontal lines	1,480,000	14,800,000	20,720,000	37,000,000
Yellow with blue vertical lines	—	11,400,000	—	600,000
Blue	1,017,500	370,000	3,515,000	4,347,500
Total	35,797,500	53,950,000	36,815,000	42,687,500
Percentages of whole	21·15	31·88	21·75	25·22

The Secretary of the Board of Trade at Calgary, Mr. C. W. Peterson, furnished the following as the wheat crop statistics of Manitoba for the years 1891 to 1902 inclusive. 1891, 25·3 bushels per acre; 1892, 16·6; 1893, 15·56; 1894, 17; 1895, 27·86; 1896, 13·33; 1897, 13·14; 1898, 17·01; 1899, 17·14; 1900, 8·90; 1901, 25·10; 1902, 26; which is an average for the twelve years of 18·57 bushels per acre, call it 18·5.

REMARKS added to the above by one of the AUTHORS of the MEMORANDUM.*

Public attention in the West has been recently directed to the possibility of fall wheat production, and the result of such investigation is startling and most encouraging. It would appear to be possible that in the near future some millions of acres of the West, which in the past have been considered as useful only from a pasturage standpoint, might be a first-class fall wheat country.

It would appear that many lands within what is styled the semi-arid belt, even in dry seasons, if well cultivated and summer-fallowed, will give a good fall wheat crop. By thorough summer fallowing and cultivation all the moisture of that season is conserved, and is sufficient to start the grain, so that it will have a fair top before the winter comes on, and that top catches the spring's snows and gives sufficient moisture to the grain to carry it on until the June showers, which generally prove sufficient to give a fair if not a very good crop of grain. The dry autumn prevents the ground from "heaving" on account of frost, which is the chief obstacle to the successful cultivation of wheat in most parts.

If the experiment proves as successful as it gives every promise of, we shall have to change our estimate of the possibilities of wheat production to a very considerable extent.

That change, however, will affect chiefly Southern Alberta and Western Assiniboia; we would probably have to add, in the case of Alberta and Western Assiniboia, several million acres which would be devoted annually to the production of wheat, and, further, the crop so far has averaged far and beyond any spring wheat crop either in Manitoba

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* By letter of 1st December 1904.

or the Territories. I think I am within the mark when I say that taking the all wheat crop of Southern Alberta for the past season as a whole (and there are a good many thousand acres under crop), it would average over 25 bushels per acre.* I was informed the other day that within a radius of 6 miles of Pincher Creek (in Southern Alberta) there were 10,000 acres of fall wheat prepared for next year's crop. That is a district which a few years ago we did not estimate would produce anything but oats, and that in no great quantity.

APPENDIX B.

STATEMENT written in March 1904, by DR. SAUNDERS, DIRECTOR OF EXPERIMENTAL FARMS, OTTAWA.

Extract from "Wheat Growing in Canada." By William Saunders, Director Dominion Experimental Farms.

Canada is widely known as a "land of plenty," and is frequently referred to as one of the future granaries of the world. The opinion has also been often expressed that the productive capacity of the land in the Dominion will, when the country is fairly settled, be more than equal to the task of supplying the Mother Country with all the wheat which her teeming millions require. Such statements are sometimes made in the absence of any definite ideas as to what the farming lands of Canada would probably be capable of producing annually if they were fairly well occupied by intelligent and industrious settlers.

The area of land suitable for the growing of agricultural crops in Canada is so vast that when presented in figures the mind needs a deal of training before their full significance can be grasped. The civilized world is gradually awakening to a somewhat hazy perception of the immense wealth laid up in the many millions of acres of fertile lands unoccupied here, and large numbers of immigrants are flocking to our shores. Commenters on these great possessions commonly pass over the large stretches of unoccupied territory in the Eastern Provinces, and direct attention mainly to the great Northwest country, a huge field for future enterprise, as yet very imperfectly understood even among our own people. In this article, it is the possibilities of the latter which will be primarily considered.

The Wheat Areas.

The following figures as to the quantity of land fit for settlement in the Province of Manitoba and the three Provisional Territories, Assiniboia, Saskatchewan and Alberta, have been obtained from official sources, and may be accepted as approximately correct for the areas in question:—

	Total Area, exclusive of Water. Acres.	Estimated Proportion suitable for Cultivation.	Acres.
Manitoba - -	41,000,000	two-thirds	equal to 27,000,000
Assiniboia - -	57,000,000	seven-eighths	„ 50,000,000
Saskatchewan -	70,000,000	three-fourths	„ 52,000,000
Alberta - -	64,000,000	two-thirds	„ 42,000,000
Total -	232,000,000		171,000,000

It is thus estimated that there are within the limits referred to, after making allowance for lands unfit for agriculture, about 171 million acres suitable for cultivation, by which is meant land of such a degree of fertility as to admit of profitable farming. It is proposed to confine our discussion on this occasion to the possibilities of agricultural progress within this area, where the quality of the soil and the conditions of climate are fairly well known. We should not, however, deal justly were we to pass over the

* The exact figures are not yet available.

great north country lying beyond the boundaries of Saskatchewan and Alberta without a few words of explanation.

The 155 million acres of land in Athabasca, and a large slice of the 340 million acres in Mackenzie, will no doubt prove important factors in the future development of Canada, but what proportion of these vast districts will be capable of the profitable growing of crops is as yet a matter of conjecture. There are, however, some proofs available showing that it is possible to grow cereals to some extent in portions of these remote districts of which our knowledge is so fragmentary.

Northern Experiments.

The writer has received samples from Dunvegan, on the Peace River, in Athabasca, 414 miles by latitude north of Winnipeg, of Ladoga wheat plump and well matured, weighing 64 lbs. per bushel; oats weighing 40 to 42 lbs. per bushel; six-rowed barley, 52 lbs. per bushel; and spring rye weighing 56 lbs. per bushel.

At Fort Vermillion, further down the Peace River, also in Athabasca, 591 miles north of Winnipeg, Ladoga wheat has been raised weighing 60 lbs. per bushel; oats, 41¾ lbs.; six-rowed barley, 51¾ lbs.; and spring rye, 57½ lbs. per bushel.

From Fort Providence, in Mackenzie, 710 miles north of Winnipeg, have come good samples of oats and spring rye; but the quantities received were too small to permit of their weight per bushel being determined.

From Fort Simpson, 818 miles north of Winnipeg by latitude, Ladoga wheat has been obtained which weighed 62½ lbs. per bushel. In this instance a small percentage of the grain was injured by frost. This is the furthest point north from which samples of cereals have been received. The time between sowing and harvesting in these far northern districts is in some instances less than it is at the Experimental Farm at Ottawa. At Dunvegan the grain was sown May 7th and harvested August 21st, giving a growing period of 101 days. The same sorts of grain grown at Ottawa, taking the average of three years, require 106 days. At Fort Vermillion the time between sowing and harvesting was also 101 days. At Fort Providence 108 days were required to bring grain to maturity, from June 1 to September 17, and at Fort Simpson the wheat was sown June 7 and harvested September 22, giving a growing period of 107 days.

The long days are an important factor in bringing about this result: the influence of increased periods of light hastens the ripening of cereals very much. This view is supported by facts brought together during a careful series of observations made some years ago by a distinguished Russian investigator, Kowalewski. He experimented with spring wheat and oats, growing them in different parts of Russia, from the far north at Arkangelsk to the southern province of Kherson. He found that in the higher latitudes the grain ripens in a shorter period than in the more southern districts, the difference varying at different points from 12 to 35 days. This author attributes the earlier ripening in the north largely to the influence of light during the long summer days. He also believes that the short seasons of quick growth have gradually brought about in these cereals an early ripening habit. In our experience with early ripening cereals, this habit is a permanent characteristic which they continue to manifest when grown in localities where the summer season is longer.

Possibilities.

Leaving now any further discussion of these enormous northern territories, let us return to the small and better known districts nearer the lines of railway. Of the 171 million acres in Manitoba and the three Provisional Territories, which are said to be suitable for cultivation, a very small part is yet under crop. In Manitoba there were 2,039,940 acres under wheat in 1902, and 1,134,385 acres in other farm crops, making a total of 3,174,325 acres. In the three Provisional Territories there were in all 625,758 acres in wheat, and about 363,879 acres in other crops, making a total of 989,637 acres, which, added to the acreage under cultivation in Manitoba, makes in all 4,163,962 acres. From this comparatively small area over 67 million bushels of wheat and nearly 59 million bushels of other grain were produced.

In 1903 the season was less favourable, and while there was an increase in the acreage of land devoted to wheat in Manitoba and the Territories, the total production has been about 52 million bushels of wheat with about 54 million bushels of other grain. While the land prepared for crop in 1904 is considerably in excess of that for 1903, it is not likely to exceed 5½ million acres in all, which is not much more than three per cent. of the land suitable for agriculture within the limits referred to.

Some comparisons may help us to understand the possibilities connected with these large but sparsely occupied districts.

The United States produces large quantities of wheat, sufficient to meet the demands of the home market for the feeding of a population of nearly 80 millions, and leaving a surplus, including flour for foreign export, equal to about 225 million bushels of wheat. From recent crop reports we learn that the total area under wheat in the United States in 1902, including winter and spring varieties, was 46,202,424 acres, which gave a crop of a little over 670 million bushels.

It does not follow that all the land fit for settlement in Manitoba and the three Provisional Territories is suitable for wheat growing. There are some localities where the season is too short to make wheat a sure crop, and farmers in such districts will find it more profitable to carry on mixed farming; but from the good crops which have been harvested during some years past in most of the settled or partly settled regions, it is evident that the greater part of the country is well suited for the growing of wheat of high quality.

Another consideration which would reduce the area annually available for wheat is that the land, to get the best results, should be summer-fallowed every third season, which means that it should not be cropped that year. Further, while many excellent farmers advocate the growing of two crops of wheat in succession, one on fallowed land, the second on stubble to be followed by fallow, it may be found more profitable in some localities to grow wheat in rotation with other crops.

On the other hand, the yield per acre of wheat in Canada is larger than it is in the United States. In 1902 the average crop given for the whole of the United States, including winter and spring wheats, was about 14·5 bushels per acre. The same year the average of spring wheat in Manitoba was 26 bushels, and in the North West Territories 25 bushels. In 1903, when the season was so unfavourable, the yield in Manitoba averaged 16·42 bushels per acre. In Ontario, in 1902, winter wheat averaged 25·9 and spring wheat 18·7 bushels.

The average of a 10 years' record tells much the same story. A 10 years' average for Manitoba from 1891 to 1900 gives 19 bushels of spring wheat per acre. During the same time South Dakota gives 10·04, and North Dakota 12·07. The wheat yield for the whole of the United States for the same period was 13·3 bushels per acre; while in Ontario, the only Province with statistics covering this period, we have an average of 19·4 of fall wheat and 15·2 per acre of spring wheat. This larger yield in Canada is no doubt partly due to the land being more productive, and partly to a more favourable climate, and in some measure to better farming.

A Reasonable Prophecy.

The total imports of wheat and flour into Great Britain in 1902 were equivalent in all to about 200 million bushels of wheat. Were one-fourth of the land said to be suitable for cultivation in Manitoba and the three Provisional Territories under crop with wheat annually, and the average production equal to that of Manitoba for the past 10 years, the total crop would be over 812 million bushels. This would be ample to supply the home demand for 30 millions of inhabitants (supposing the population of Canada should by that time reach that figure) and meet the present requirements of Great Britain three times over. This estimate deals only with a portion of the West, and it leaves the large Eastern Provinces out of consideration altogether. From this it would seem to be quite possible that Canada may be in a position, within comparatively few years, after supplying all home demands, to furnish Great Britain with all the wheat and flour she requires and leave a surplus for export to other countries. With a rural population on the western plains in 1902 of about 400,000, over 67 million bushels of wheat were produced. Add to this the wheat grown in Ontario and the other Eastern Provinces and we already have a total of over 93 million bushels. These figures are full of promise for the future of Canada as a great wheat-exporting country.

Summary.

[Known wheat-growing area in Western Canada, 171,000,000 acres.
Of which there is now under cultivation, 5,000,000 acres.
Present production of wheat and other grains, 125,000,000 bushels.
Possible wheat production (one-fourth under crop annually), 800,000,000 bushels.]

APPENDIX C.

STATEMENT written in 1902 by Mr. HUGH MCKELLAR, DEPUTY MINISTER of AGRICULTURE, MANITOBA.

THE AGRICULTURAL POSSIBILITIES OF THE CANADIAN NORTH WEST.

In considering this subject we will first note the areas of the provinces or territories included as follows:—

District.	Area in Square Miles.		Land Area in Acres.
	Water.	Land.	
Manitoba	9,890	64,066	41,002,240
Assiniboia	1,000	89,340	57,177,600
Saskatchewan	6,000	108,000	69,120,000
Alberta	745	99,255	63,523,200
		Total	230,823,040

It is well known that this area cannot all be called farming land that is fit for agricultural purposes.

In Manitoba, if you draw a line from the south-eastern corner of the province to the north-western corner, the choice farming lands are to the south-west of this line, and even from this certain districts on the Riding Mountains, the Sand Hills, south of Carberry, &c., must be deducted

In Assiniboia it is well known that the choice farming lands are in the eastern third of that territory. In Saskatchewan for the present we may only consider that portion south of the Saskatchewan river, and parts of this are not considered grain farming land.

In Alberta we have the ranching district in the south, and the timbered districts along the foothills and away in the north-western part of the territory.

From careful computation, conservative it may be, the area of farming lands, after deducting forests, mountains, swamp land, arid districts, and all road allowances, may be estimated as follows:—

	Acres.
Manitoba	23,000,000
Assiniboia	19,000,000
Saskatchewan	17,000,000
Alberta	16,000,000
Total	75,000,000

Of this 75,000,000, it is estimated that at least 20,000,000 in Manitoba and 10,000,000 in the Territories have already passed out of the hands of the Dominion Government and Railway Companies as homesteads or sales. This leaves 47,000,000 of said farming lands to be disposed of.

Now I notice that the total entries of homesteads for the year ending June 30, 1902, were 14,838, representing a total area of 2,373,120 acres, and I learn that the sales of all railway lands during the same period of time were approximately 2,126,880 acres, a grand total for the year of 4,500,000 acres. At this rate of entry and sales it will only take 10 years for the disposal of the 45,000,000 above referred to.

The possibility of such settlement may to some appear visionary, but the figures speak for themselves, and if the ratio of increase continues as it has been doing for the past two or three years, all will be gone before the 10 years figured out above elapse.

In writing a short article on this subject it is utterly impossible to give anything like a detailed description of the many varied districts that would be specially noted in a more extended description. It is only possible to glance at some definite portion that is well known, and note what has been done. Then, by comparison, we may grasp some faint idea of the agricultural wealth that is in the soil of the Canadian North West, millions of acres of which have, as yet, not a single farmer located thereon. For a moment, then, let us consider Manitoba alone. Here we find 41,102,240 acres, of which 23,000,000 are choice farming lands, easy of cultivation, and of which this year only

3,189,015 acres are under crop, and, say, 500,000 summer fallow, making in all 3,689,015 broken. Within the next 10 years we may expect at least, 10,000,000 to be under cultivation.

In the Territories the area under crop in 1902 may be given as 1,000,000 acres The old policy of raising just so much wheat and so many head of stock has been abandoned. We have passed out of that line, and are now energetically reaching out to the highest possibilities of production of each individual farmer. Development in the course of the next 10 years is going to be much more rapid than in any 10 years of the past.

Now for production:—Computing by last year's acreage and crop the increased acreage in 10 years, Manitoba will be producing in one year

168,340,280 bushels of wheat,
92,655,290 „ „ oats,
21,787,180 „ „ barley,

and in all grains 283,932,860 bushels.

It is no stretch of the imagination to assume that the Territories, Assiniboia, Saskatchewan, and Alberta, will catch up and exceed Manitoba in crop acreage before another 10 years pass, for they have more than twice the area of farming land that is in Manitoba. Giving eastern Assiniboia the full benefit of increased acreage in wheat for which it is specially noted, Alberta an extra on oats, and Saskatchewan the average increase for which it is noted of all kinds of grain we should have at least in 10 years from now a crop from Manitoba and the Territories of 350,000,000 bushels wheat, 200,000,000 of oats, and 50,000,000 of barley.

Now it will be noticed that this production is from a little over 20,000,000 acres of the 75,000,000 referred to, that is an average of about 43 acres cropped on each 160 acres. Three times this acreage (say 130 acres on each 160) is more likely what will be cultivated as soon as this great territory is properly farmed, and that would mean three times the figures just quoted or over 1,000,000,000. bushels of wheat, 600,000,000 bushels of oats, and 150,000 000 bushels of barley. Will this be done in the next 25 years? It may be. Well may Canada be called "Britain's Granary."

This would still leave 14,000,000 of the 75,000,000 yet unbroken for pasture or hay. In the early settlement of Manitoba hay could be secured so plentifully on our low lands that no one thought of cultivating grasses and it was tacitly at least conceded that we could not grow timothy, clover, &c. Time and experience have proved the opposite, for we can grow excellent crops of timothy, brome grass, and native rye grass, for feeding purposes, and cattle do well during the winter on the straw of our cultivated grains. Grain is always cut on the greed side. This leads to the question of stock raising. It is still in its infancy. The above figures on grain raising are interesting, but an estimate of the stock that could be grown and fed not only on the 75,000,000 acres directly under cultivation as farm holdings, but on the millions of acres not included in the same (at least 100,000,000) would be equally interesting and instructive.

The figures should include cattle, sheep and hogs. I have been asked to give a brief description of the soil, climate, &c., of this great North West. This I consider quite unnecessary. A soil and climate that for 20 years in succession give us only two short crops (half a crop in each year) and give an average crop of nearly 20 bushels of wheat per acre, requires no other certificate as to their suitability for agricultural purposes.

As to the number of inhabitants likely to find employment here, allowing 320 acres to each farmer, it would take 234,375 farmers to hold the 75,000,000 acres, and allowing five persons to a family would be 1,171,875 souls. A family to every 160 acres would mean double this number, that is 2,343,750 souls. So far in Manitoba the population on farms as compared with cities, towns, and villages is about as 2 to 1. This would give us over 1,000,000 in cities and towns. This is not counting those engaged in ranching, nor those engaged in developing the timber and manufacturing industries, which must certainly be established in our timber and mining districts. The possibility of our agricultural industry to-day diverts attention thereto, almost exclusively, while all our implements, our clothing, our boots and shoes are imported. With increased population, such as is herein outlined, industries of all kinds will be established to supply our wants, and the population possible to be sustained can best be calculated by comparison of population statistics of other countries or States, for the agricultural producing class must bear a definite proportion to all other classes that provide manufactured goods for their consumption.

I shall not attempt the compilation of these figures, but shall only refer to the glowing description of the Great Saskatchewan district by the Rev. John McDougall, the veteran pioneer of Methodism, now Superintendent of Indian Missions in that great territory, who, in the early days, 30 years ago, on reaching the top of a great

mound elevation, saw "countless thousands of buffalo quietly grazing on these vast " plains far as the eye could see. An area now deserted by the buffalo is still unclaimed " and shall remain unclaimed until the teeming multitudes of congested lands and " cities find their way to this land of plenty, and again cover its broad acres with " domesticated animals."

Winnipeg, July 11th, 1904.

With increased knowledge of the North-West Territories gained during the past two years, I might change some of the figures given herein, but not to detract from the area or the future possibilities of the same.

HUGH MCKELLAR.

APPENDIX D.

MEMORANDUM on the MAP showing the DISTRIBUTION of POPULATION and the RACIAL ORIGIN of the IMMIGRANTS.

This map is based upon details procured from the Commissioner of Immigration at Winnipeg, Mr. T. Obed Smith, and from local inquiries made by the writer at the different centres, principally of the Dominion Land Agents, who are personally acquainted with the various groups of settlers in their respective districts.

In some cases, where the settlement of groups of foreign immigrants takes place in large numbers in a district newly opened for settlement, it is easy to indicate the racial origin; but in the older districts where the population is of mixed racial origin it is not easy to discriminate the groups with sufficient clearness for representation upon a map of comparatively small dimensions.

The portions of the map coloured red in slender diagonal lines indicate a population predominantly of British origin; those coloured red in cross hatched lines indicate a population partly of Canadian origin and partly of immigrants from the United States, it being sometimes impossible to distinguish the repatriated Canadian family from the family of British origin which had been resident, perhaps, for many years in the United States. The thick red horizontal lines, on the other hand, represent areas in which the settlement is known to be wholly or almost wholly American settlement properly so called. In these areas the people have immigrated from the United States, to which country they have belonged for one or more generations. Of this class are the Mormon settlers in Southern Alberta, about the intersection of long. 113° with lat. 49°. Again, very many of the immigrants from the United States have arrived in compact nuclear groups, and have therefore been classified along with the race to which the nuclear group belongs. For example, the large groups of German Catholics, long. 112° lat. 53°, and long. 105° lat. 52° are classified as Germans and not as Americans. The Mennonite groups (long. 98°, lat. 49°) are also classified as Germans because they speak German and because they have probably a strong admixture of German blood.*

The large groups of the Galicians will be recognised, as also the considerable groups of French-Canadians and French and Scotch half-breeds, as well as large groups of Scandinavians, including principally Danes and Swedes. The Finlanders and Icelanders are separately classified.

The indications of settlement along the main line of the Canadian Pacific Railway are very approximate, and no attempt has been made to indicate the racial origins of the urban population. The indications refer to the owners of homesteads or purchased farms. The squares indicate townships or areas of 36 square miles. Each township contains 144 farms of 160 acres each. One settler and his family may occupy one or more of these farms. When the township is approximately fully occupied the area is wholly covered with colour; when it is approximately one half occupied it is covered to the extent of one half and so on. Where one class of settler occupies one half and another the other half, this circumstance is indicated.

The reserves, for instance the Doukhobor (Russian) and the Britannia (British), though not wholly occupied, are so represented. Should the people for whom they are intended fail to occupy them within a certain time any lands in the reserves not entered for will be declared open to settlement.

The concentration of population in three great centres is very noticeable: Winnipeg Prince Albert, and Edmonton.

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* For the origin of the Mennonites *see* text of Report, p. 12.

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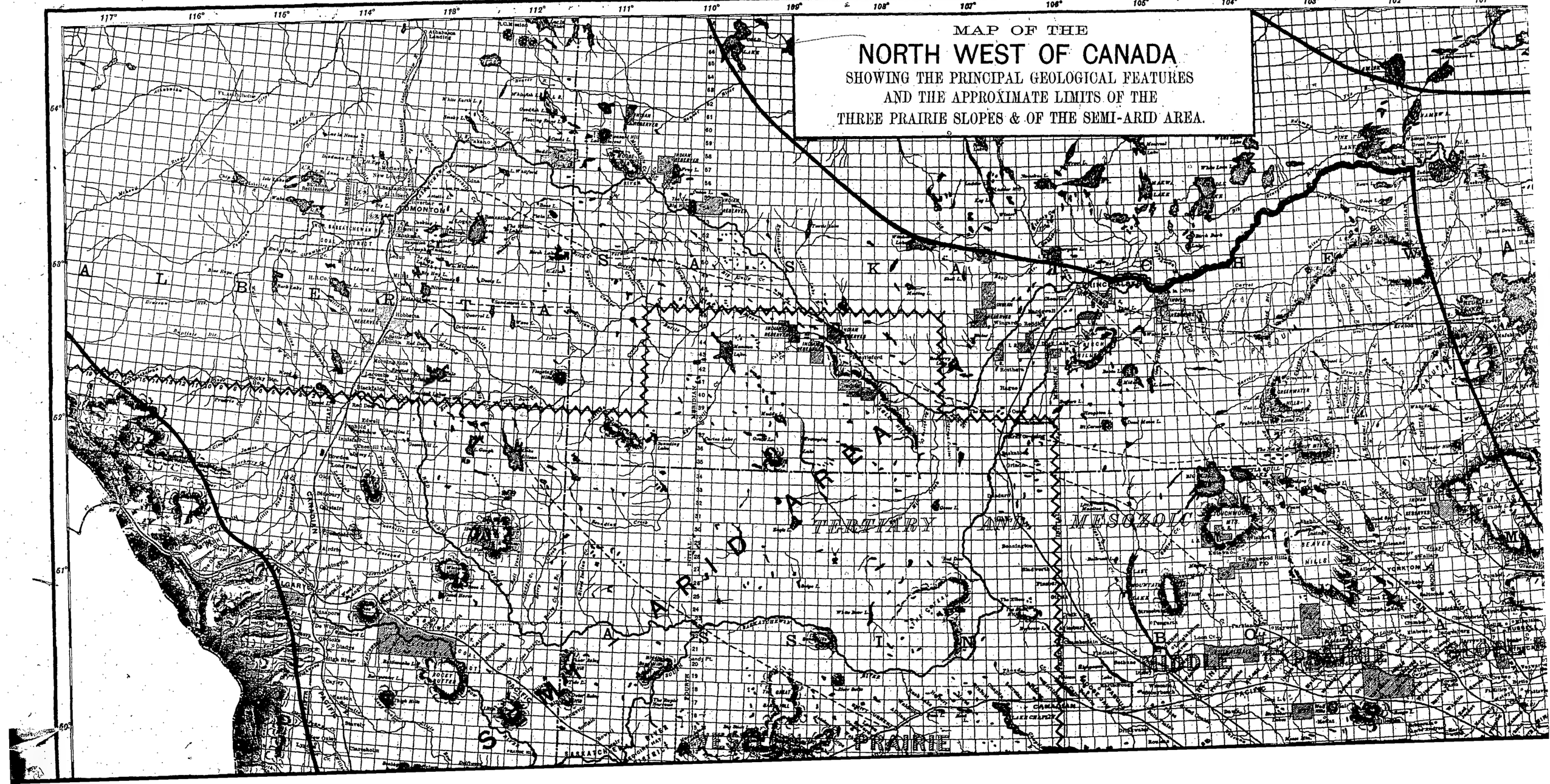
MAP OF THE
NORTH WEST OF CANADA
SHOWING THE PRINCIPAL GEOLOGICAL FEATURES AND THE APPROXIMATE LIMITS OF THE THREE PRAIRIE SLOPES & OF THE SEMI-ARID AREA.



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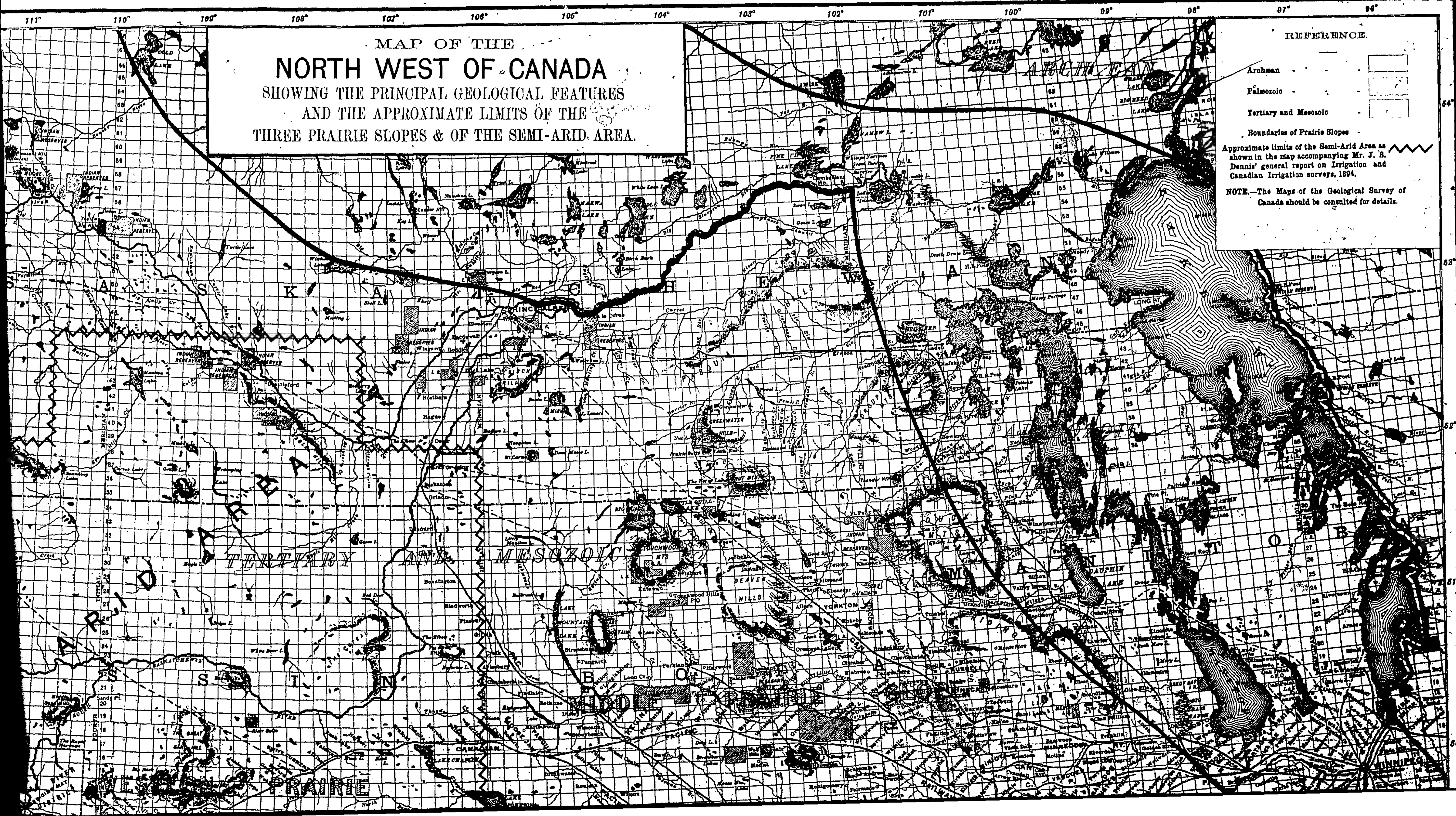
MAP OF THE
NORTH WEST OF CANADA
SHOWING THE PRINCIPAL GEOLOGICAL FEATURES
AND THE APPROXIMATE LIMITS OF THE
THREE PRAIRIE SLOPES & OF THE SEMI-ARID AREA.
REFERENCE.
Archæan
Palæozoic
Tertiary and Mesozoic
Boundaries of Prairie Slopes
Approximate limits of the Semi-Arid Area as shown in the map accompanying Mr. J. S. Dennis' general report on Irrigation and Canadian Irrigation surveys, 1894.
NOTE.—The Maps of the Geological Survey of Canada should be consulted for details.
111°
110°
109°
108°
107°
106°
105°
104°
103°
102°
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100°
99°
98°
97°
96°
ARCHÆAN
TERTIARY
AND
MESOZOIC
MIDDLE
PRAIRIE
SLOPE
YORKTON
WINNIPEG
DAUPHIN
LAKE
BEAVER
HILLS
TOUCHWOOD
GREENWATER
PRINCE ALBERT
Battleford
Rosthern
Saskatoon
Cumberland

THREE PRAIRIE SLOPES & OF THE SEMI-ARID AREA.

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PRAIRIE SLOPES & OF THE SEMI-ARID AREA.

Tertiary and Mesozoic

Boundaries of Prairie Slopes

Approximate limits of the Semi-Arid Area as shown in the map accompanying Mr. J. S. Dennis' general report on Irrigation and Canadian Irrigation surveys, 1894.

NOTE.—The Maps of the Geological Survey of Canada should be consulted for details.

SASKATCHEWAN

ASSINIBOIA

ALBERTA

SEMI-ARID AREA

TERTIARY AND MESOZOIC

WESTERN PRAIRIE SLOPE

MIDDLE PRAIRIE SLOPE

EASTERN PRAIRIE SLOPE

MANITOBA

ONTARIO

MINN.

DAKOTA

INTERNATIONAL BOUNDARY

110 109° 108° Longitude West 107° from Greenwich 106° 105° 104° 103° 102° 101° 100° 99° 98° 97°

64° 63° 62° 61° 60° 59° 58° 57° 56° 55° 54° 53° 52° 51° 50° 49° 48°

HELIOZINCOGRAPHED AT THE ORDNANCE SURVEY OFFICE, SOUTHAMPTON. 1905.

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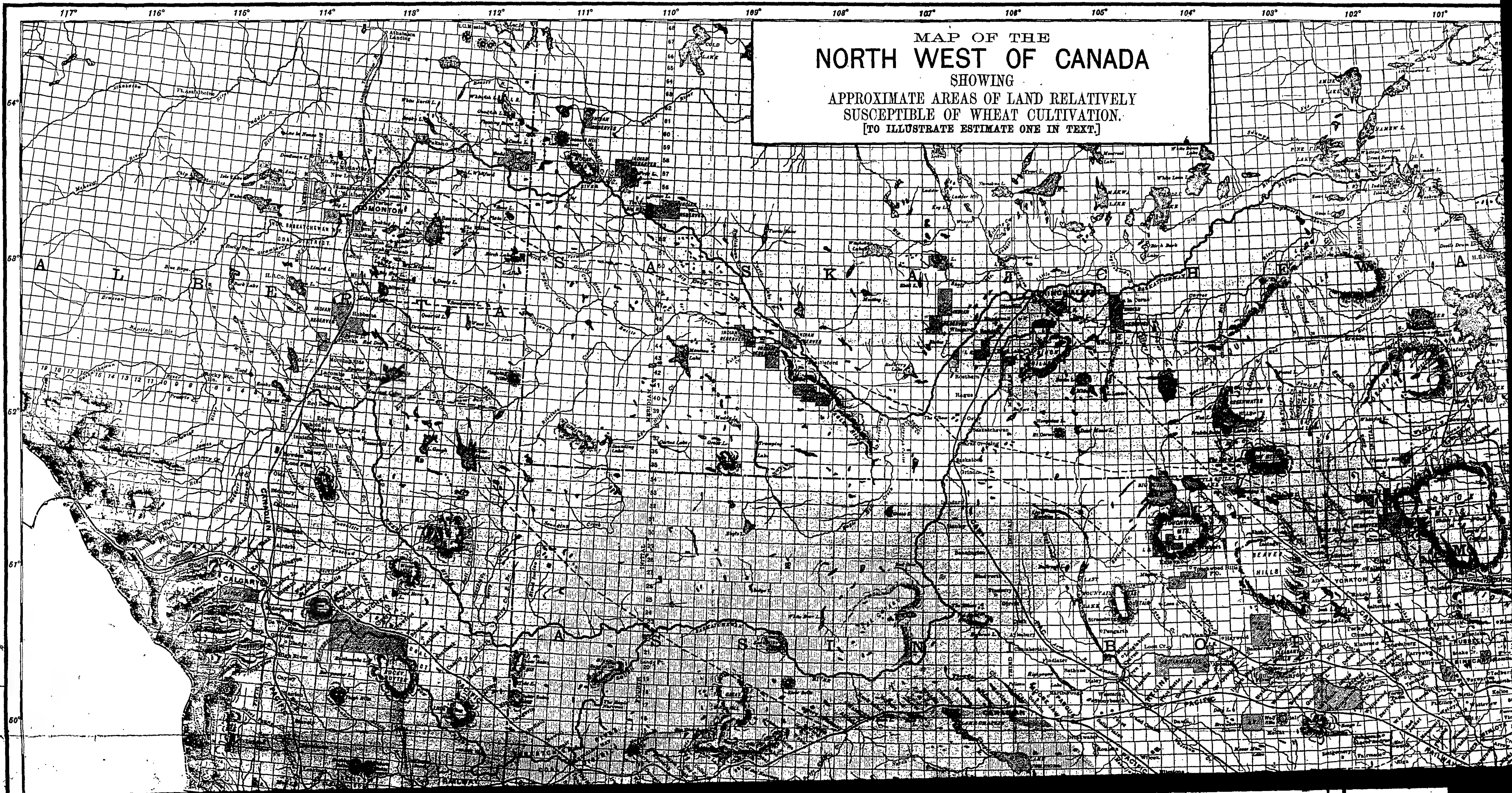
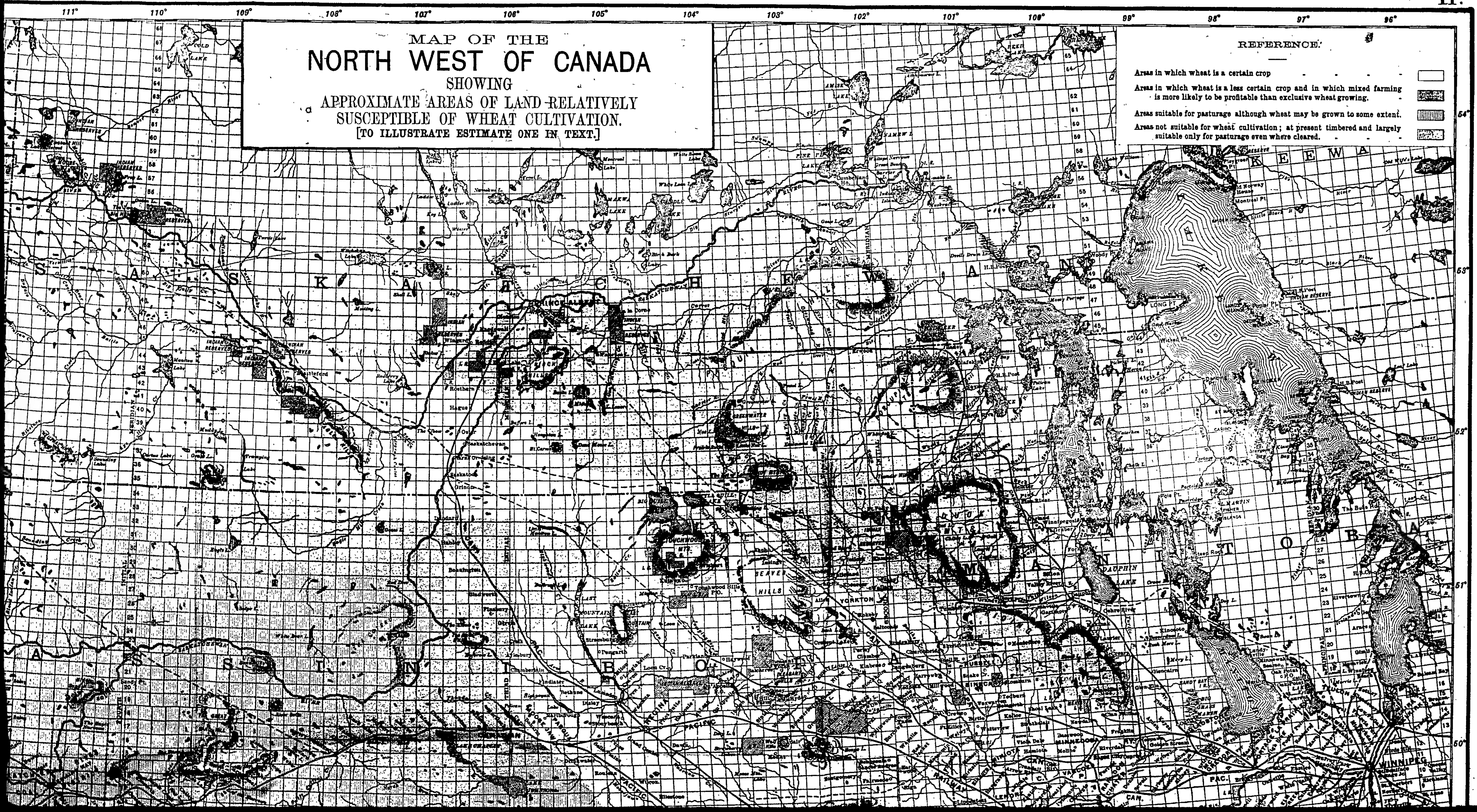

MAP OF THE
NORTH WEST OF CANADA
SHOWING
APPROXIMATE AREAS OF LAND RELATIVELY
SUSCEPTIBLE OF WHEAT CULTIVATION.
[TO ILLUSTRATE ESTIMATE ONE IN TEXT.]
117°
116°
115°
114°
113°
112°
111°
110°
109°
108°
107°
106°
105°
104°
103°
102°
101°
54°
53°
52°
51°
50°
EDMONTON
CALGARY
YORKTON
A L B E R T A
S A S K A T C H E W A N
A S S I N I B O I A

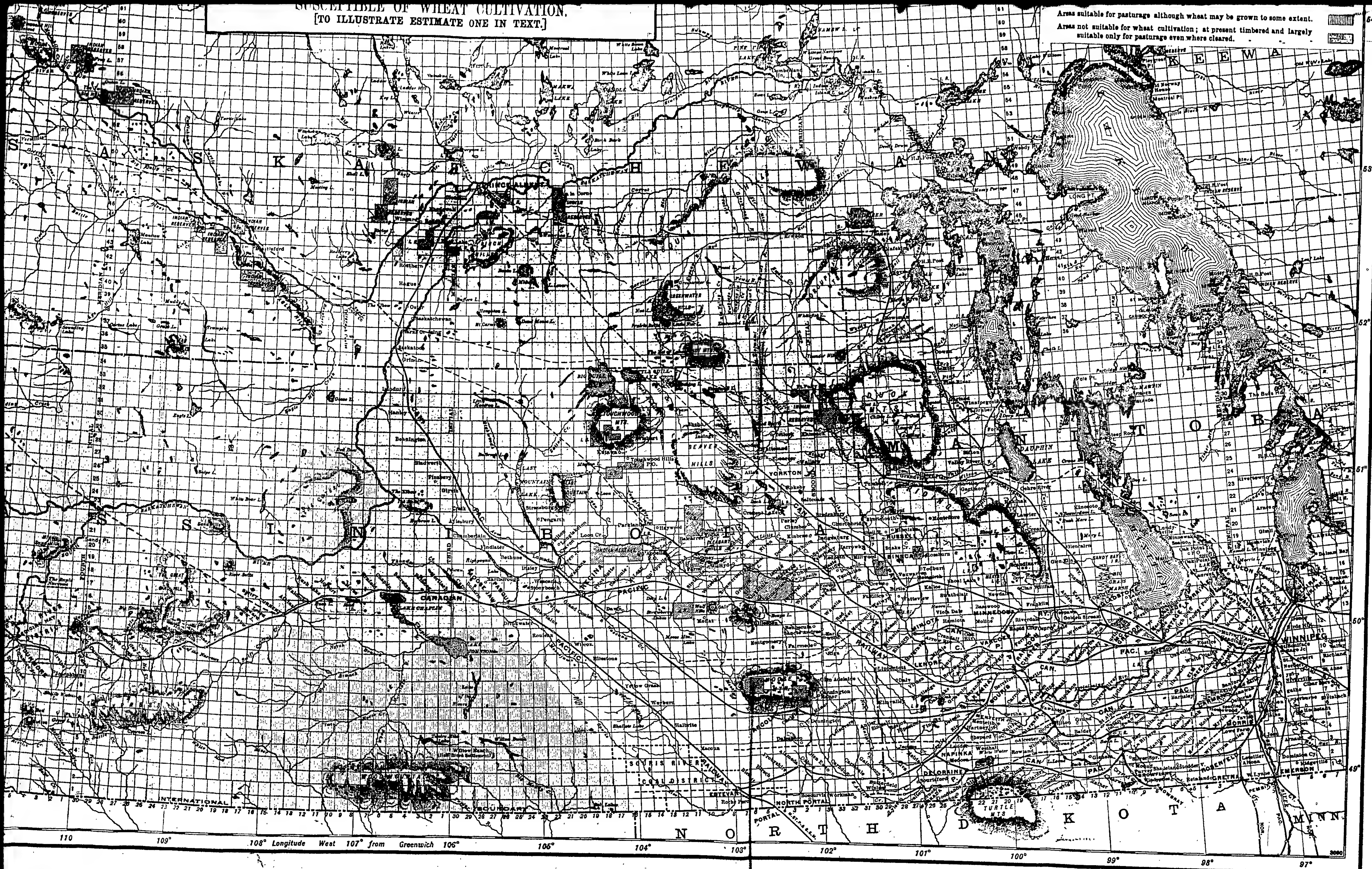
2 of


MAP OF THE
NORTH WEST OF CANADA
SHOWING
APPROXIMATE AREAS OF LAND RELATIVELY
SUSCEPTIBLE OF WHEAT CULTIVATION.
[TO ILLUSTRATE ESTIMATE ONE IN TEXT.]
REFERENCE.
Areas in which wheat is a certain crop
Areas in which wheat is a less certain crop and in which mixed farming is more likely to be profitable than exclusive wheat growing.
Areas suitable for pasturage although wheat may be grown to some extent.
Areas not suitable for wheat cultivation; at present timbered and largely suitable only for pasturage even where cleared.
SASKATCHEWAN
ASSINIBOIA
MANITOBA
KEEWATIN
WINNIPEG
YORKTON
PRINCE ALBERT
DAUPHIN LAKE
TOUCHWOOD HILLS
BEAVER HILLS

SUSCEPTIBLE OF WHEAT CULTIVATION.

[TO ILLUSTRATE ESTIMATE ONE IN TEXT.]

308



HELIOZINCOGRAPHED AT THE ORDNANCE SURVEY OFFICE, SOUTHAMPTON. 1905.

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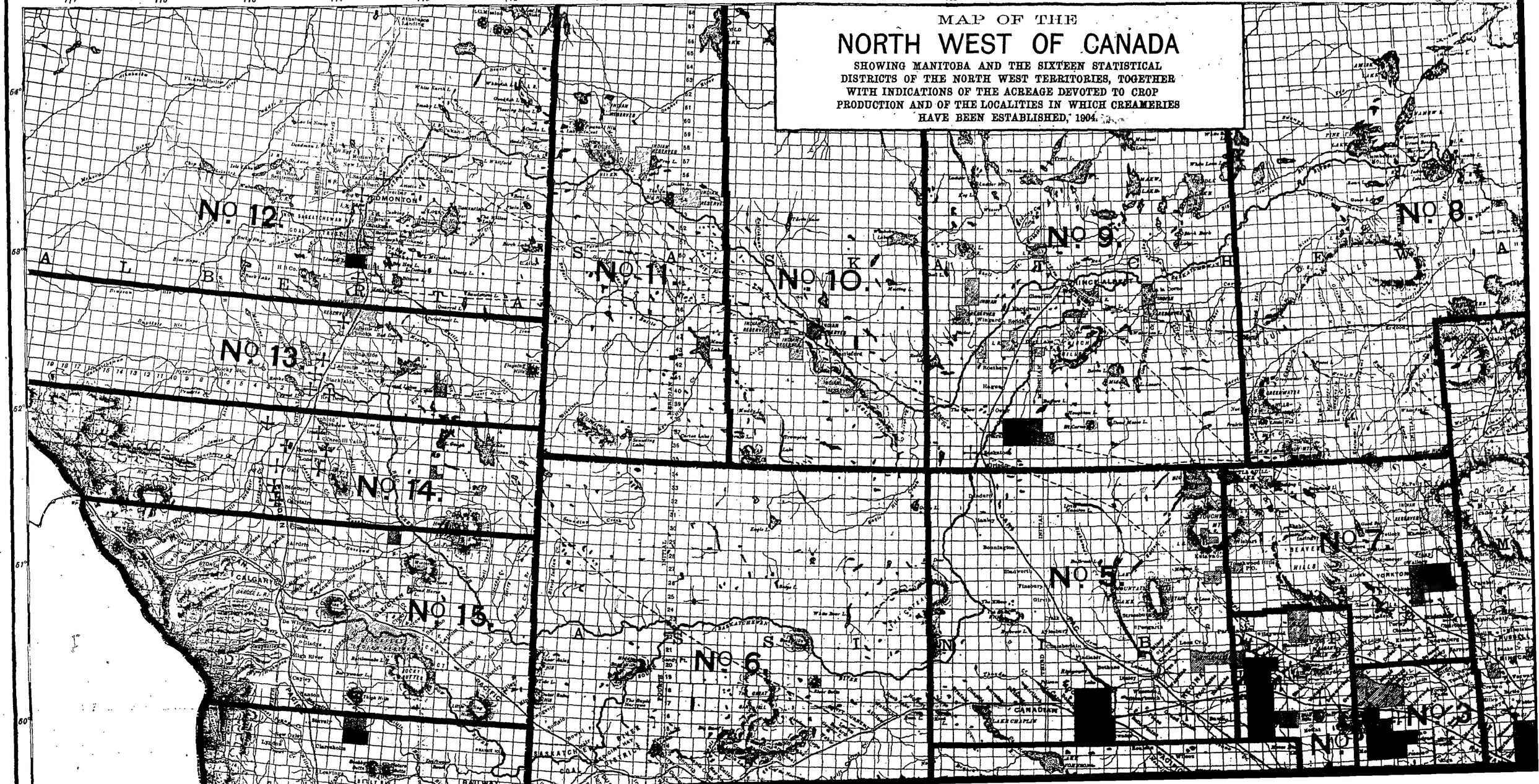
MAP OF THE

NORTH WEST OF CANADA

SHOWING MANITOBA AND THE SIXTEEN STATISTICAL DISTRICTS OF THE NORTH WEST TERRITORIES, TOGETHER WITH INDICATIONS OF THE ACREAGE DEVOTED TO CROP PRODUCTION AND OF THE LOCALITIES IN WHICH CREAMERIES HAVE BEEN ESTABLISHED, 1904.



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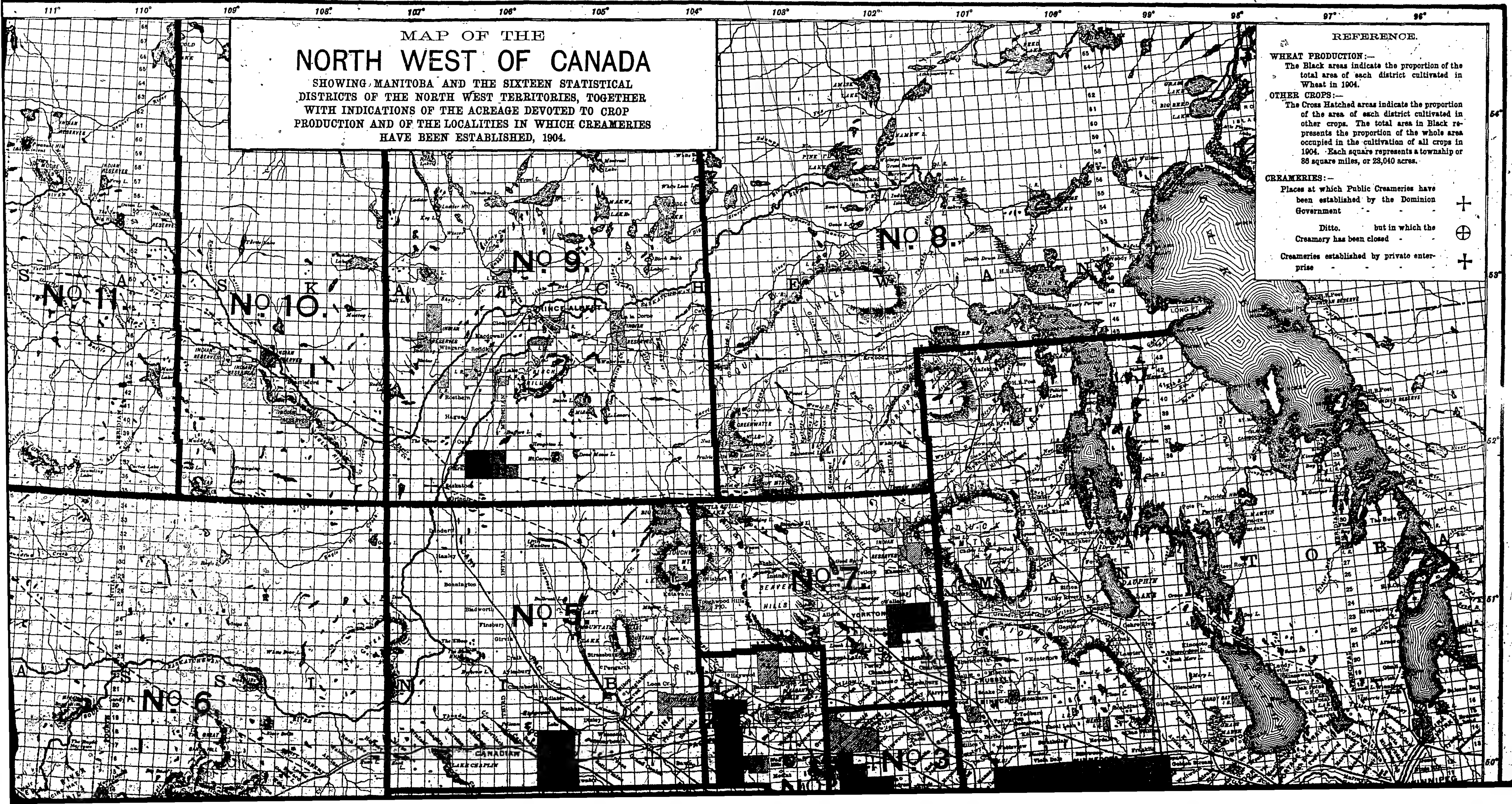
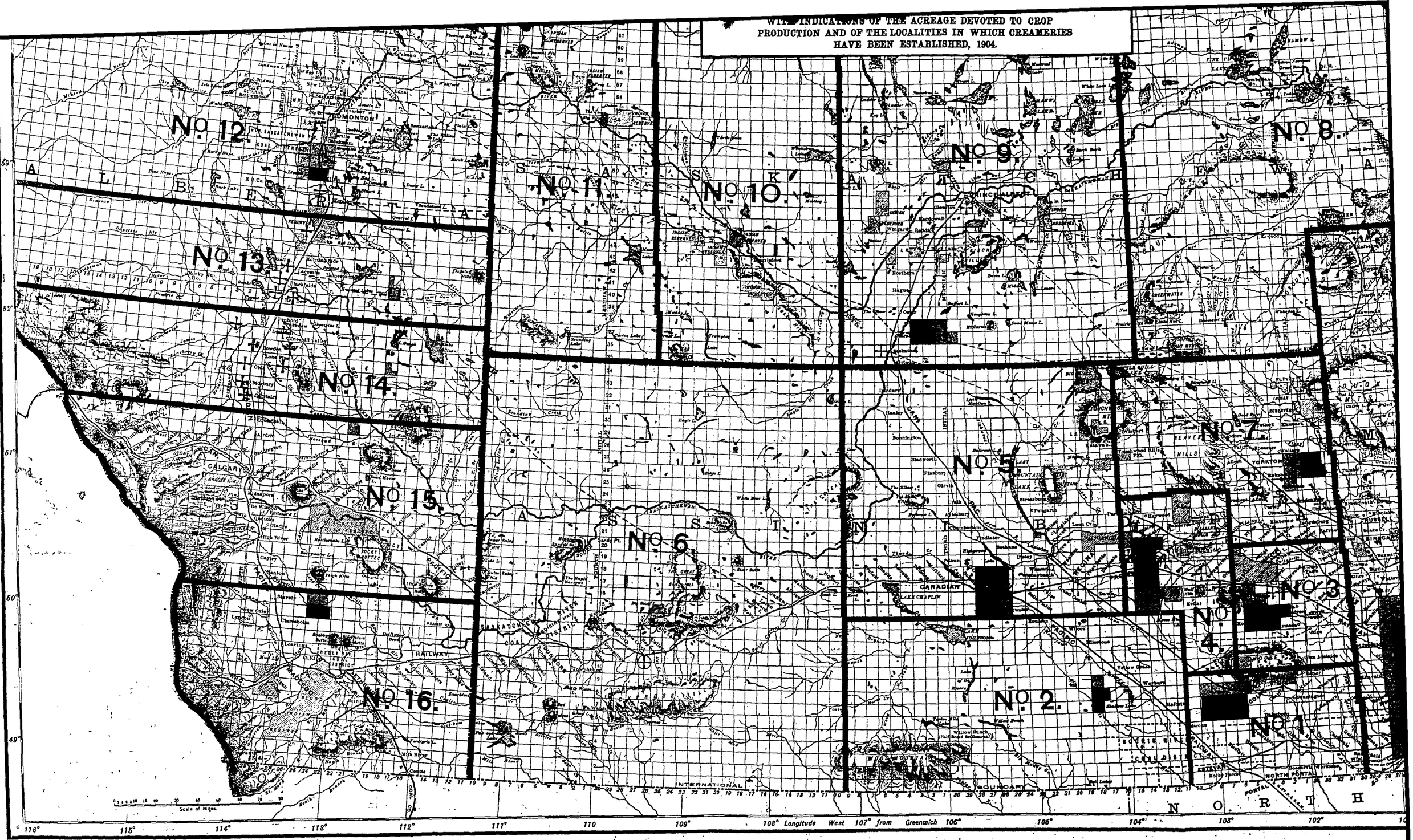

MAP OF THE
NORTH WEST OF CANADA
SHOWING MANITOBA AND THE SIXTEEN STATISTICAL DISTRICTS OF THE NORTH WEST TERRITORIES, TOGETHER WITH INDICATIONS OF THE ACREAGE DEVOTED TO CROP PRODUCTION AND OF THE LOCALITIES IN WHICH CREAMERIES HAVE BEEN ESTABLISHED, 1904.
REFERENCE.
WHEAT PRODUCTION:— The Black areas indicate the proportion of the total area of each district cultivated in Wheat in 1904.
OTHER CROPS:— The Cross Hatched areas indicate the proportion of the area of each district cultivated in other crops. The total area in Black represents the proportion of the whole area occupied in the cultivation of all crops in 1904. Each square represents a township or 36 square miles, or 23,040 acres.
CREAMERIES:— Places at which Public Creameries have been established by the Dominion Government
Ditto, but in which the Creamery has been closed
Creameries established by private enterprise
No. 11
No. 10
No. 9
No. 8
No. 7
No. 6
No. 5
No. 3
PRINCE ALBERT
YORKTON
DAUPHIN
MANITOBA
SASKATCHEWAN
111°
110°
109°
108°
107°
106°
105°
104°
103°
102°
101°
100°
99°
98°
97°
96°
54°
53°
52°
51°
50°

WITH INDICATIONS OF THE ACREAGE DEVOTED TO CROP PRODUCTION AND OF THE LOCALITIES IN WHICH CREAMERIES HAVE BEEN ESTABLISHED, 1904.



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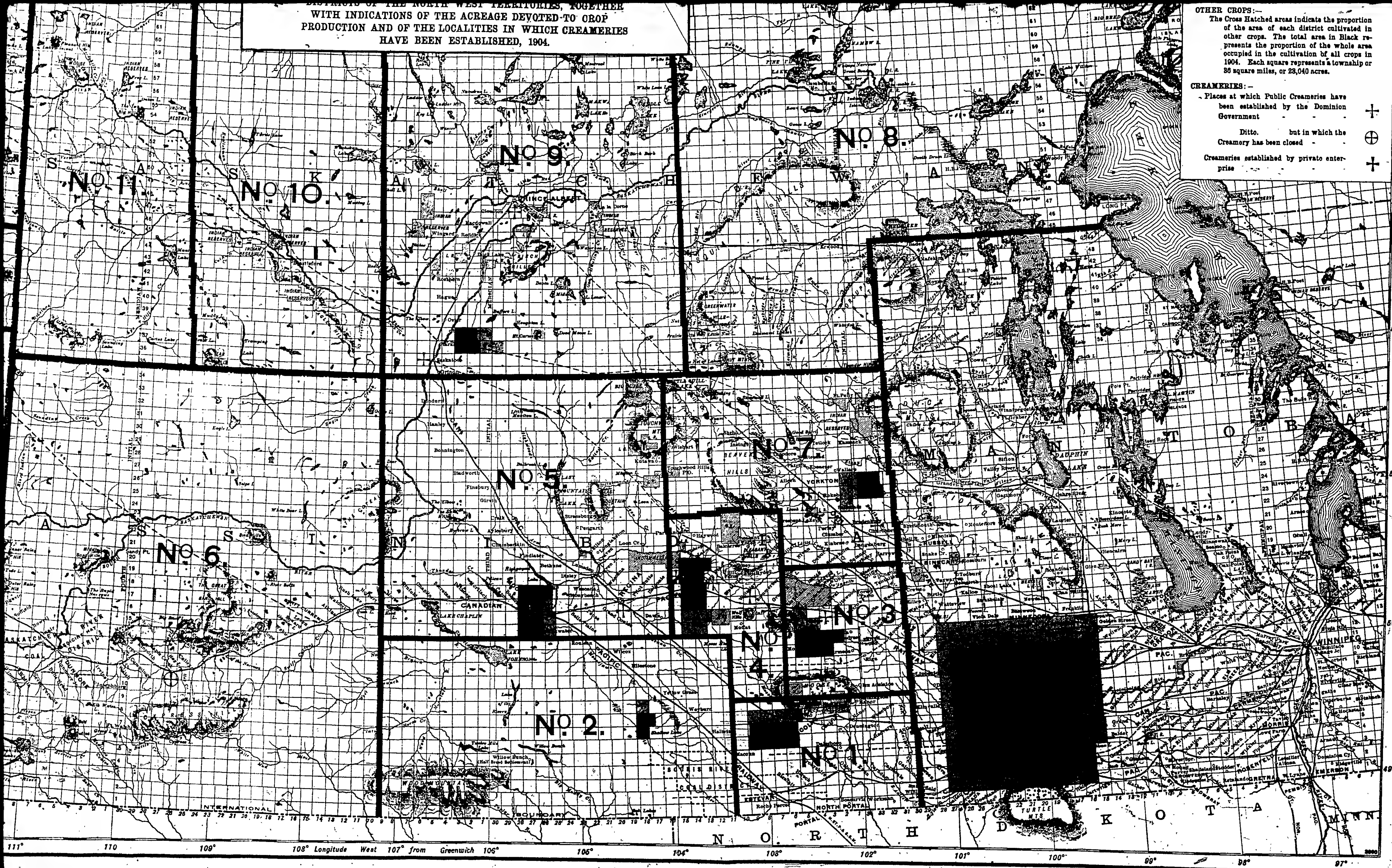

HELIOZINCOGRAPHED AT THE ORDNANCE SURVEY OFFICE, SOUTHAMPTON, 1905.

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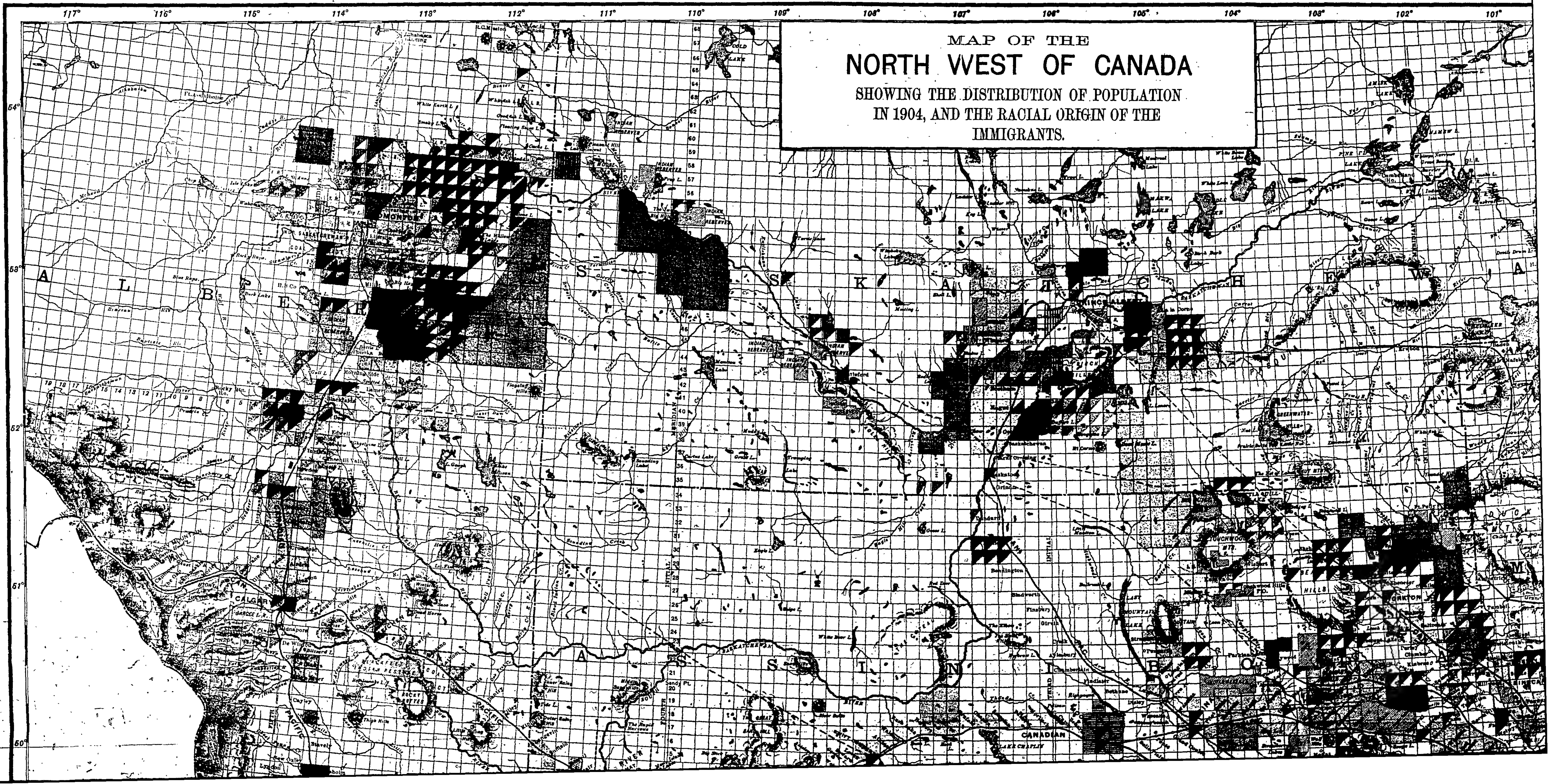
MAP OF THE
NORTH WEST OF CANADA
SHOWING THE DISTRIBUTION OF POPULATION
IN 1904, AND THE RACIAL ORIGIN OF THE
IMMIGRANTS.
117°
116°
115°
114°
112°
111°
110°
109°
108°
107°
106°
105°
104°
102°
101°
54°
53°
52°
51°
50°
A L B E R
S A S K A T C H E W A N
A S S I N B O I A
CALGARY
EDMONTON
PRINCE ALBERT
Ft. Assiniboine
Athabasca Landing
COLD LAKE
AMISK LAKE
PINE ISLAND LAKE
Cumberland Ho.
TOUCHWOOD MTS.
BEAVER HILLS
Lacombe
Red Deer
Edwell
Blackfalds
Lamerton
Morning Side
Ponoka
Battle
Gull L.
Innisfail
Olds
Crossfield
Airdrie
Midnapore
De Winton
Okotoks
Cayley
Stavely
Gleichen
Cluny
Bassano
Langdon
Cheadle
BLACKFEET INDIAN RESERVE
ROCKY BUTTES
Thigh Hills
Sounding Lake
Sounding Creek
Manitou Lake
Battleford
Saskatoon
Grindon
Dundurn
Bennington
Bladworth
Finsbury
Girvin
Craik
Aylesbury
Chamberlain
Findlater
Bethune
Dilsey
Yorkton
Saltcoats
Langenburg
Kamsack
Sandy Pt.
GREENWATER HILLS
THE GREAT SAND HILL
LAKE CHAPLIN
CANADIAN PACIFIC
INDIAN RESERVE
INITIAL MERIDIAN
FOURTH
THIRD
FIFTH
DUCK MTS.
ROCKY MOUNTAIN PARK
Duck Lake
Rosthern
Wood Mountain
Birch Hills
Lake Lenore
St. Louis
Kinistino
Carrot River
Red Deer River
Swampy L.
Old Wives
Eagle Hill Creek
Beaver Hills
Vermilion
Flagstaff Hills
Brazeau River
Baptiste R.
Pembina
Ribstone
Cactus Lake
Muddy L.
Tramping Lake
Grass L.
Eagle L.
Snipe L.
White Bear L.
Goose L.
Last Mountain Lake
Little Manitou L.
Quill Lake
Stony
Kananaskis
Canmore
Banff
Laggan
Shepard
Carstairs
Didsbury
Bowden
Penhold
Wetaskiwin
Leduc
Strathcona
Fort Saskatchewan
Lac la Biche
St. Albert
Stony Plain
Victoria
Whitford L.
Whitefish L.
Beaver R.
Moose Lake
Frog L.
Pleasant Hill
Ladder Hill
Montreal Lake
White Swan Lake
Wapiti
Sturgeon Lake
Sask. River
Fort a la Corne
Egg L.
Nut L.
Nut Mtn.
Fishing L.
Stony L.
Prairie
Stone L.
Teal L.
Big Hay L.
Island L.
Nameu L.
Chapel L.
Roddick
Hague
Osler
Clarks Crossing
Lumsden
Qu'Appelle
Strassburg
Parkland
Tantallon
Churchbridge
Carlyle
Ebenezer
Carlton Trail
Sheho
Fishing L.
Pelly
Cote
Swan River
Shell L.
Moosejaw
Brigade
Touchwood
Wishart
Kutawa
Whitefish L.
Prairie River
Etoimami
Red Deer
Greenwater L.
Cumberland
Lone Pine
Buffalo Lake
Clear Water R.
Medicine R.
Wolf Creek
Blindman R.
Battle R.
Ribstone Cr.
Acadia
Hand Hills
Berry Cr.
Dead Horse L.
Wintering Hills
Saskatchewan
River

MAP OF THE NORTH WEST OF CANADA

SHOWING THE DISTRIBUTION OF POPULATION IN 1904, AND THE RACIAL ORIGIN OF THE IMMIGRANTS.

REFERENCE.

- * Canadians of British origin
- * Canadians (largely repatriated from the United States) and Americans (excepting as otherwise specified)
- French and Scots, half-breeds
- French Canadians and French
- Recent Colonies of British origin
- * Americans (excepting as otherwise specified)
- Germans
- Scandinavians
- Icelanders
- Finlanders
- Austrians (Galicians & Bukowinians)
- Hungarians
- Russians (Doukhobors)
- Roumanians
- Hebrews
- Belgians
- Small group of Nestorians
- Indian Reserves

* These indications are a mere approximation. The others are nearly accurate.

The settlement of Canadians is very approximately indicated; there are groups all along the railway lines.

The squares indicate townships of 36 square miles. When a township is approximately fully occupied, it is wholly coloured; when it is partially occupied, the extent is approximately indicated.

The map has been compiled from information received from the Commissioner of Immigration at Winnipeg, and from the Dominion Land Agents at the different centres.

Further particulars as to the compilation of this map will be found in Appendix D.

IN 1904, AND THE RACIAL ORIGIN OF THE IMMIGRANTS.

French and Scots, half-breeds	
French Canadians and French	
Recent Colonies of British origin	
* Americans (excepting as otherwise specified)	
Germans	
Scandinavians	
Icelanders	
Finlanders	
Austrians (Galicians & Bukowinians)	
Hungarians	
Russians (Doukhobors)	
Roumanians	
Hebrews	
Belgians	
Small group of Nestorians	
Indian Reserves	

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HELIOZINCOGRAPHED AT THE ORDNANCE SURVEY OFFICE, SOUTHAMPTON, 1905.

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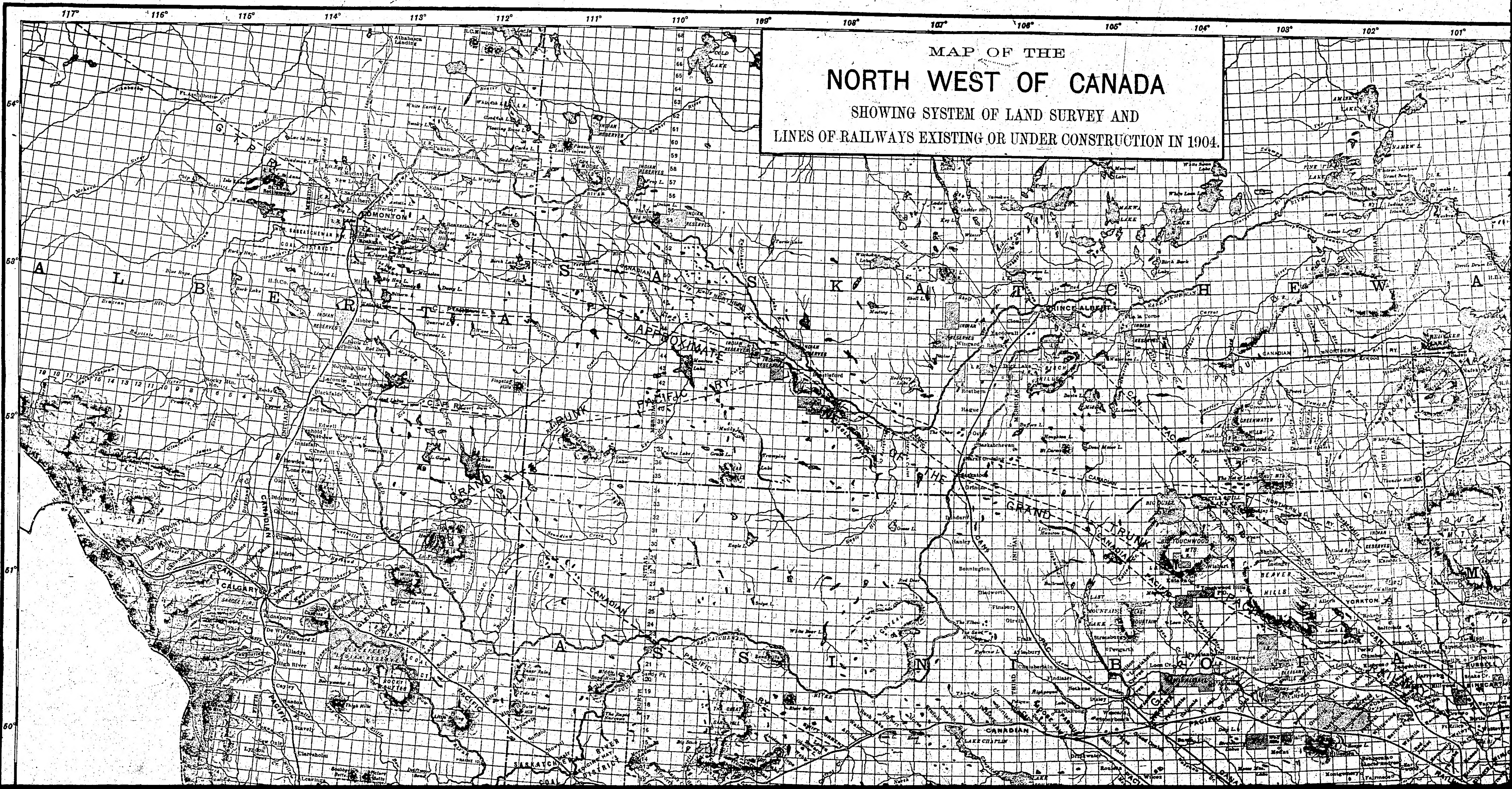

MAP OF THE
NORTH WEST OF CANADA
SHOWING SYSTEM OF LAND SURVEY AND
LINES OF RAILWAYS EXISTING OR UNDER CONSTRUCTION IN 1904.
EDMONTON
CALGARY
PRINCE ALBERT
YORKTON
Battleford
Saskatoon
A L B E R T A
S A S K A T C H E W A N
A S S I N I B O I A
GRAND TRUNK PACIFIC RY.
CANADIAN NORTHERN
CANADIAN PACIFIC
APPROXIMATE

20

V.

MAP OF THE NORTH WEST OF CANADA

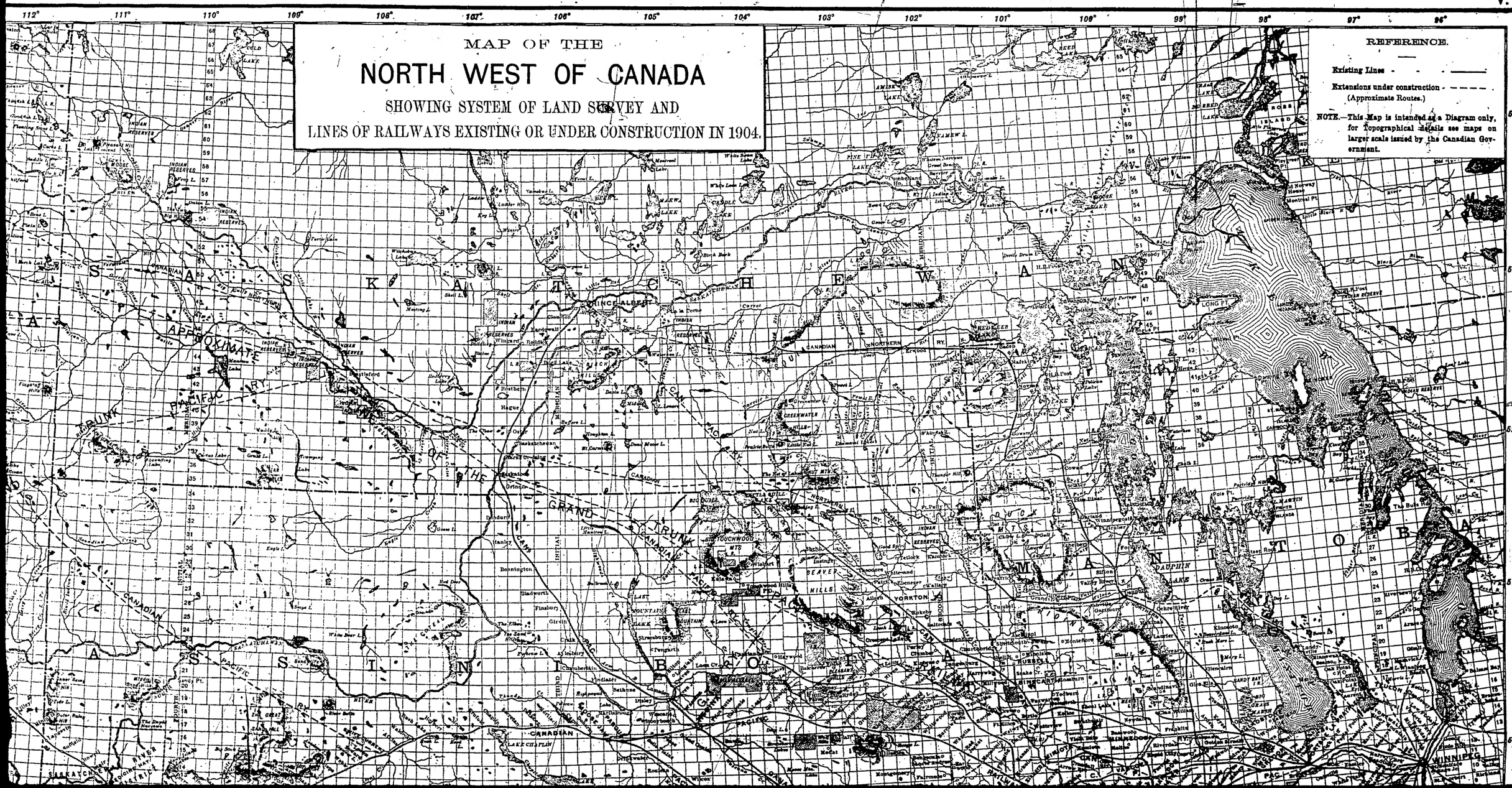
SHOWING SYSTEM OF LAND SURVEY AND
LINES OF RAILWAYS EXISTING OR UNDER CONSTRUCTION IN 1904.

REFERENCE.

Existing Lines - - - - ———

Extensions under construction - - - - -
(Approximate Routes.)

NOTE.—This Map is intended as a Diagram only, for Topographical details see maps on larger scale issued by the Canadian Government.



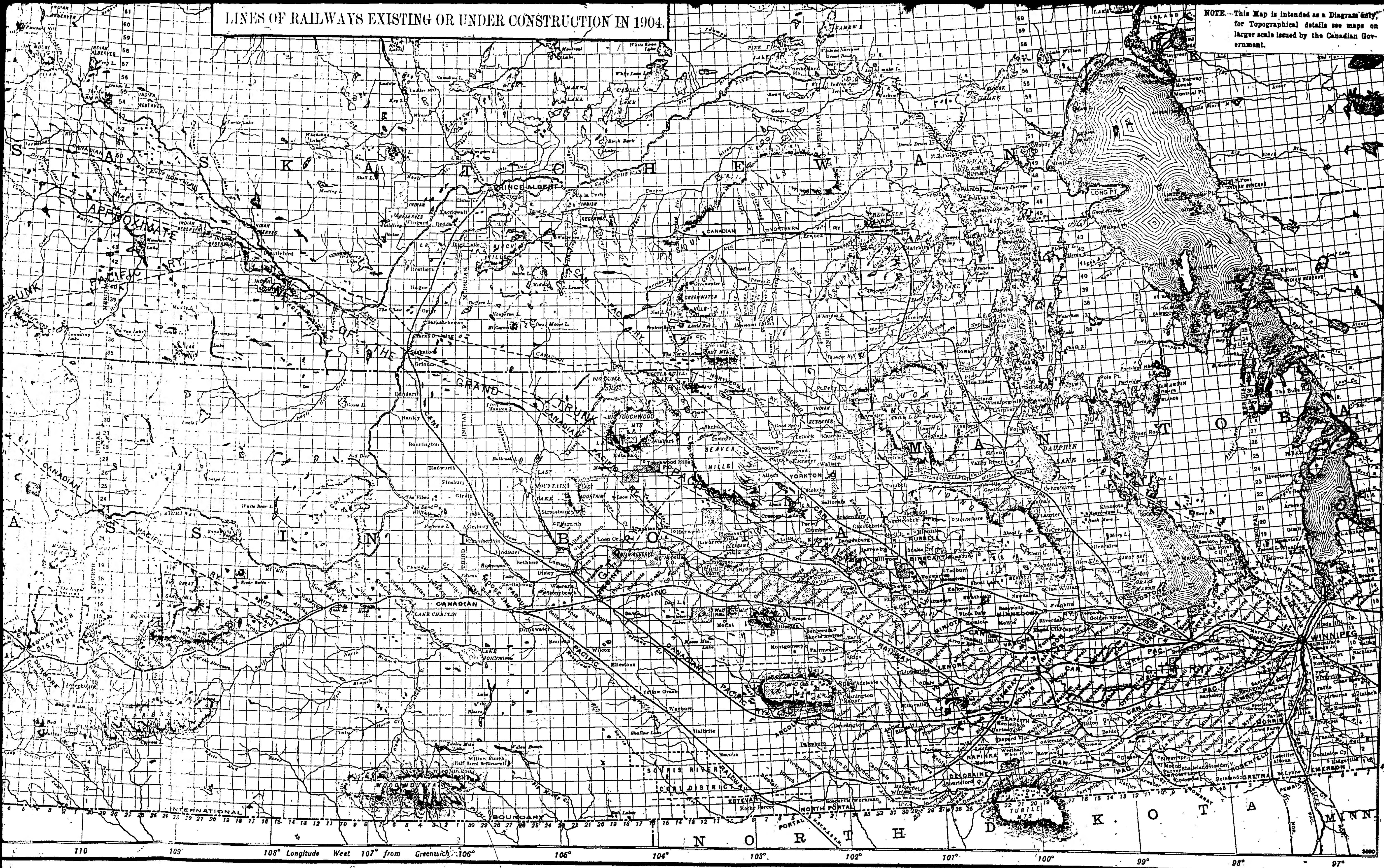
NORTH WEST OF CANADA

SHOWING SYSTEM OF LAND SURVEY AND

LINES OF RAILWAYS EXISTING OR UNDER CONSTRUCTION IN 1904.

LINES OF RAILWAYS EXISTING OR UNDER CONSTRUCTION IN 1904.

NOTE.—This Map is intended as a Diagram only, for Topographical details see maps on larger scale issued by the Canadian Government.



HELIOZINCOGRAPHED AT THE ORDNANCE SURVEY OFFICE, SOUTHAMPTON. 1905.

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